

—Mr. Holmes D. Ely, the new Superintendent of the Relief Department of the Pennsylvania, was born in Bucks County, Pa., March 11, 1845. When a boy he worked on the Marietta & Cincinnati. At the age of 16 he was appointed shop clerk at Lambertville, N. J., on the Belvidere Delaware and the Flemington, which are now a part of the Pennsylvania. In July, 1861, he entered the Superintendent's office, also serving as extra passenger conductor and extra telegraph operator. In 1871 he was made General Accountant, and when the road was leased to the Pennsylvania he was appointed Chief Clerk of the Belvidere Division. On the establishment of the Relief Department in 1886 he was appointed its Assistant Superintendent.

—Mr. Charles P. Krauth, Secretary and Treasurer of the McConway & Torley Co., died at his home in Pittsburgh, Wednesday, Dec. 27. Mr. Krauth will be well remembered and his death will be deeply regretted by a great number of railroad men. He was a man of accomplishments and cultivation, who knew well how to get and give enjoyment as he went through the world, and he took a deep interest in charitable work. All this was apart from his recognized ability as a business man. Mr. Krauth was born in Nova Scotia and educated at the University of Pennsylvania and at Freiberg, Germany. His grandfather was President of the Gettysburg Theological Seminary in Pennsylvania. Mr. Krauth was for years a District Superintendent of Pullman's Palace Car Company, and later District Superintendent of the Wagner Car Company, and for 12 years he had been with the McConway & Torley Company.

—Mr. W. C. Nixon, who became General Superintendent of the Gulf, Colorado & Santa Fe lines of the Atchison, Topeka & Santa Fe system on Jan. 1, was born Feb. 15, 1858, and entered railroad service on the Burlington & Missouri River in Nebraska, Feb. 1, 1878, as bridge carpenter. On August 1, 1878, he became watchman, baggage master and clerk of the Atchison at Emporia, Kan. He served as clerk and cashier at Albuquerque, agent at Las Cruces and in April, 1885, became chief clerk to the Division Superintendent at San Marcial in October, 1885, he was made Trainmaster of the Southern Kansas division, and in April, 1889, Superintendent of Terminals at Kansas City. On June 1, 1890, he was promoted to a Division Superintendency and was subsequently Superintendent of Terminals at Chicago and General Agent. On January 1, 1897, he was appointed Superintendent of the lines east of the Missouri River, which position he occupied until his removal to his present position at Galveston.

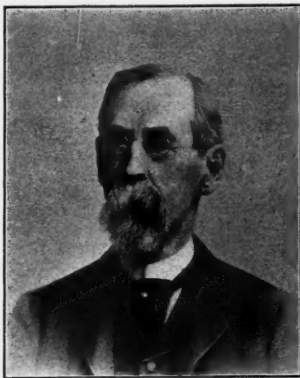
—Mr. Thomas Fitch Rowland was elected an Honorary Member of the American Society of Civil Engineers Jan. 2. Mr. Rowland was born at New Haven, Conn., March 15, 1831. When a boy he became a locomotive fireman and finally an engine driver, and later apprentice in the shops of the New York, New Haven & Hartford. He served for a short time as Assistant Engineer on a Sound steamer and then took a position at the Allaire Works in New York City, building marine engines, etc. Later he went with the Atlantic Dock Iron Works in Brooklyn, building sugar mill machinery and stationary and marine engines. In course of time he had charge of the drawing department at these works, designing many marine engines and boilers, among them those of the first steam revenue cutter in the service of the United States, the "Harriet Lane." In 1857 he designed for the Morgan Iron Works the machinery of the United States sloop of war "Seminole." He was employed later to design and superintend the construction of an iron steamer to run between New Orleans and Mobile. This was for Mr. Samuel Sneden, with whom Mr. Rowland entered into partnership to build iron vessels. He designed a plate iron pipe for the Croton Aqueduct crossing of the Harlem River, which, in partnership with Mr. Sneden, he built. This pipe was $7\frac{1}{2}$ ft. inside diameter and $\frac{1}{4}$ in. thick and about 1,350 ft. long. In 1861 he made designs for an armor-clad warship, and later took part in building a number of the monitors. In 1867 he began the business of building gas producing machinery, in which he made many improvements, and some of his designs have become standard. Since 1887 the Continental Iron Works has been an incorporated company, of which Mr. Rowland had been President ever since.

—Rear Admiral George Wallace Melville, U. S. N., was elected an Honorary Member of the American Society of Civil Engineers Jan. 2. Admiral Melville entered the navy at the beginning of our civil war, when he was 20½ years old, and served through the war as an engineer officer. He took part in a number of engagements and especially distinguished himself in cutting out the Confederate cruiser "Florida" in the harbor of Bahia, Oct. 7, 1864. The vessel was captured by ramming, which mode of attack Melville suggested, and in preparation boarded the Confederate cruiser in disguise to ascertain the location of her machinery and armament. Of course he would have been executed as a spy if caught. In the midnight action he sent all but one of his force on deck, handling the machinery practically alone. When the "Wachusett," the Federal ship, struck the "Florida," Melville joined the boarding party and was the only man wounded on the Federal side. Since the war his career has gone on ever with new distinction. August 9, 1887, he was nominated to the office of Engineer-in-Chief, which place he has filled continuously ever since. He has designed the steam machinery of most of the modern ships of the Union now afloat and has acted for years on the Naval Board of Construction, which determines the general features of design as to armor, armament and machinery. During the Spanish-American war his skill and activity were constantly felt and the design and use of those novel and efficient additions to a modern fleet, the distilling ship and the repair ship, were due to him more than to any other one man. He was one of the earliest naval engineers, perhaps the earliest, to venture to put triple screws into warships. The "Columbia" and the "Minneapolis" of our navy were the first large vessels so fitted. Since their building almost 750,000 tons of triple-screw ships have been added to the European navies. Melville first went to the Arctic regions in the relief steamer "Tigrits" in 1873 in search of the remnants of Captain Hall's expedition, and in July, 1879, he again sailed for the North in the "Jeannette" commanded by Lieut. de Long. The record of the retreat of the officers and men of this ship is one of the most extraordinary stories of all Arctic endeavor. In 100 days, carrying with them stores and provisions to

the amount of 290 lbs. per man, they traveled 2,200 miles through the Arctic floes to the Lena Delta. De Long and the men under his immediate charge perished, but Melville brought his crew through safely. Then Melville searched a thousand miles for De Land and on a second attempt, made in the spring, he found and buried his dead comrades. He has just served a term as President of the American Society of Mechanical Engineers, and is a member in various grades of many scientific and learned bodies.

—Mr. J. A. Anderson, Superintendent of the Relief Department of the Pennsylvania, was on January 1 retired from active service, and Mr. Ely was appointed Superintendent. Mr. Matthias Homer was appointed Assistant Superintendent. The Directors of the company adopted a suitable minute, to go on record as a recognition of Mr. Anderson's long and eminent service.

John Alexander Anderson was born June 6, 1829, and in 1848, when 19 years of age, entered the railroad service as rodman in the Engineer Corps under Ashbel Welch, Chief Engineer, and Martin Coryell, Principal Assistant, then locating the Belvidere Delaware railroad. He occupied various positions with the Belvidere Delaware and Flemington railroads up to the position of Assistant Superintendent until July 1, 1870, when he was promoted to the Superintendency, which he held until April, 1872, when he was appointed Superintendent of those roads comprising the Belvidere Division of the Pennsylvania Railroad. From September 1, 1881, that division also included the Delaware and Raritan Canal. In January, 1886, upon the organization of the Pennsylvania Voluntary Relief Department, in which are associated the principal lines in



the company's system east of Pittsburgh, he was appointed Superintendent of the Department. His organizing abilities, the benevolent trend of his mind, his sterling character, and inflexible integrity, peculiarly fitted him for the position; and the great success of the Relief Department has been due in large measure to his work. This department seems destined to be a vital and permanent factor, constantly growing in its beneficence, in the maintenance of harmonious relations between labor and capital.

Mr. Anderson's name is familiar to readers of the Railroad Gazette, especially those of a dozen years ago when he wrote on questions of train despatching. His book on this subject, "The Train Wire," was the first thorough and scientific treatise in the field and it is still the best. He acted with the committee of the American Railway Association in the work of revising the train despatching rules, and the pioneer work done in his books has thus been availed of by nearly all the great railroads of the country, to the great enhancement of the safety of lives and property.

Mr. Anderson was relieved from active service several months ago on account of failing health, and his complete retirement now comes about through the new pension system.

ELECTIONS AND APPOINTMENTS.

Boston & Maine.—Charles A. Messer has been appointed Assistant Superintendent of the Concord Division, with headquarters at Concord, N. H., effective Dec. 20.

Chicago & Alton.—G. J. Charlton has been appointed General Passenger Agent, succeeding his father J. Charlton, resigned.

Chicago & Northwestern.—B. J. Sweatt has been appointed Acting Division Engineer of the Madison Division, with headquarters at Baraboo, Wis., succeeding A. A. Schenck, transferred, effective Dec. 15.

Chicago Great Western.—George Gregory has been appointed Division Master Mechanic, with headquarters at Dubuque, Ia.

Chicago, Milwaukee & St. Paul.—F. S. Bond, Vice-President, has resigned, to take effect as soon as R. Miller, Chairman of the Board, can arrange to relieve Mr. Bond of his duties, which may not be until the first of June. A. C. Bird, heretofore General Traffic Manager, has been elected Third Vice-President. J. H. Hiland, heretofore General Freight Agent, has been appointed General Traffic Manager, succeeding Mr. Bird. E. S. Keeley has been appointed General Freight Agent, succeeding Mr. Hiland.

Choctaw, Oklahoma & Gulf.—Henry Wood, General Manager of the C. O. & G., has resigned to accept the Presidency of the Choctaw & Memphis. John H. Harris has been appointed Superintendent and G. W. Thompson has been appointed Assistant to Mr. Harris of the C. O. & G.

Cincinnati, New Orleans & Texas Pacific.—W. A. Shoemaker has been appointed Secretary, with headquarters at Odd Fellows' Temple, Cincinnati, O., succeeding A. Telford, resigned and transferred to another department. R. D. Lankford has been appointed Assistant Secretary, with headquarters at 80 Broadway, New York. M. F. Molloy, heretofore Acting Auditor, has been appointed Auditor, with headquarters at Odd Fellows' Temple, Cincinnati, O., effective Jan. 1.

Columbus, Sandusky & Hocking.—The office of Superintendent and Chief Engineer, held by G. H. Kimball, has been abolished, effective Jan. 1.

Davenport, Rock Island & Northwestern.—On Dec. 18 the following officers were elected: President, J. W. Gates, succeeding H. B. Schuler, resigned; Vice-President, John Lambert; Secretary and

Treasurer, Chas. G. Gates, succeeding E. T. Schuler, resigned; Assistant Secretary, O. Owen, and Auditor, C. F. Roche.

Delaware, Lackawanna & Western.—Lincoln Bush, in addition to his duties as Engineer of Bridges, has been appointed Acting Division Engineer of the Morris & Essex Division, with headquarters at Hoboken, N. J.

Elrie & Wyoming Valley.—George T. Slade has been appointed General Manager, in charge of all departments, except the Accounting Department, with headquarters at Dunmore, Pa., effective Jan. 1.

Galveston, Houston & Northern.—The positions of General Manager and Acting General Manager having been abolished, W. W. Kent has been appointed Manager, effective Jan. 1. Mr. Kent continues to discharge the duties of General Freight and Passenger Agent.

Grand Trunk.—Thos. McHattie has been appointed Master Mechanic, instead of Acting Master Mechanic of the Eastern Division, with headquarters at Montreal, Que. A. G. Elvin has been appointed Master Mechanic in charge of the Montreal Shops, succeeding Wm. Aird, retired. Effective Jan. 1.

Great Northern.—F. J. Hawn has been appointed Superintendent of the Breckenridge Division, with headquarters at Breckenridge, Minn., succeeding J. M. Davis, resigned. J. C. Nolan has been appointed Assistant Superintendent of the Montana Division, with headquarters at Havre, Mont., succeeding F. J. Hawn, transferred, effective Jan. 1.

Illinois Central.—J. S. Weltzell has been transferred to Omaha, Neb., as Assistant General Freight Agent, with headquarters at the corner of Fourteenth and Farnum Streets. F. H. Harwood has been appointed Assistant General Freight Agent, with headquarters at Evansville, Ind., succeeding Mr. Weltzell, effective Dec. 20.

Lehigh Valley.—The position of Assistant Superintendent of Motive Power has been abolished, and John S. Lentz has been assigned to other duties.

Minneapolis & St. Louis.—Albert P. Tanner has been appointed General Superintendent, succeeding Thomas E. Clarke, who resigned to accept a position with the Iowa Central. (See E. & A., p. 901.)

New York Central & Hudson River.—Schuyler Hazard has been appointed Division Engineer of the Pennsylvania Division, with headquarters at Corning, succeeding L. J. Carmalt, resigned. Cornelius Murphy has been appointed Supervisor of Track for Sub-Division No. 26, with headquarters at Munson, Pa., succeeding J. L. Sughrue, transferred.

E. J. Richards, heretofore Assistant General Passenger Agent, has been appointed Chief Assistant General Passenger Agent, with headquarters at New York. Frank J. Wolfe, heretofore General Agent Passenger Department, has been appointed Assistant General Passenger Agent, with headquarters at New York. Effective Jan. 1.

New York, Philadelphia & Norfolk.—J. G. Rodgers has been appointed Superintendent, succeeding R. H. Nicholas, resigned, effective Jan. 1.

Pennsylvania.—On Dec. 27 the Board of Directors provided for an additional Assistant Treasurer and an Assistant to the Treasurer. H. P. Conner, heretofore Acting Assistant Treasurer, is appointed Assistant Treasurer and Geo. A. Walker is appointed the new Assistant to the Treasurer. Holmes D. Ely, heretofore Assistant Superintendent of the Relief Department, has been appointed Superintendent of the Relief Department, succeeding J. A. Anderson, retired on pension. Matthias Homer has been appointed Assistant Superintendent of the Relief Department.

Pennsylvania Company.—T. W. Demarest, heretofore Master Mechanic at Logansport, Ind., has been appointed Superintendent of Motive Power, succeeding S. P. Bush, resigned. Effective Jan. 1.

Rome, Watertown & Ogdensburg (New York Central & Hudson River).—Edwin Parsons, Treasurer, has been elected Vice-President and W. H. Platt Assistant Secretary.

Southern.—W. F. H. Finke, heretofore Assistant Engineer at Washington, D. C., has been appointed Resident Engineer at Washington, his jurisdiction to embrace the Washington, Richmond and Danville Divisions and the Norfolk Division between Monroe and Danville. The office of Assistant Engineer at Greensboro has been abolished.

C. S. Hayden has been appointed Superintendent of the Anniston Division, succeeding C. L. Ewing, transferred.

Southern Indiana.—E. S. Walker has been appointed Master Mechanic. The position of Superintendent of the Bedford Belt is abolished. Effective Jan. 1.

Texas & New Orleans.—William Whyte has been appointed Superintendent.

Texas Central.—P. T. Mooney, heretofore Master Mechanic, has been appointed Master Car Builder, a position formerly held by Mr. Mooney. W. B. Warren has been appointed Master Mechanic, with headquarters for the present, at Walnut Springs, Tex., effective Jan. 1.

Toledo & Ohio Central.—The following new Directors have been elected: D. Axtell (President), N. Monsarrat (Vice-President), C. H. Coster, G. M. Cumming and James H. Hoyt. (See RR. News column.)

Toledo, Peoria & Western.—T. N. Kucher, heretofore Assistant Master Mechanic of the Pennsylvania Co., has been appointed Master Mechanic of the T. P. & W., succeeding B. Warren.

Wabash.—The line between Detroit and Chicago, including the Helmer Branch and Montpelier yard, will hereafter be operated as the Detroit Division. Geo. M. Burns having charge as Superintendent, with headquarters at Detroit, Mich. Until further notice, the jurisdiction of Geo. S. McKee, Master Mechanic; E. K. Woodward, Resident Engineer, and W. S. Dames, Superintendent of Bridges and Buildings, of the Eastern Division, will be extended over the Detroit Division.

Chas. Gleason has been appointed Secretary to General Superintendent H. L. Magee, succeeding O. C. Timewell, who becomes Mr. Magee's Chief Clerk.

RAILROAD CONSTRUCTION. New incorporations, Surveys, Etc.

APPOMATTOX, BUCKINGHAM & CUMBERLAND.—Application will be made to the Virginia Legislature for a charter for this company to build from Appomattox on the Norfolk & Western, northeast about 35 miles to Cumberland C. H., or to some point on the Farmville & Powhatan. The incorporators are: James R. Werth and M. L. Van Doren, of Richmond; Senators H. D. Flood of Appomattox and A. D. Watkins of Prince Edward; Delegate E. W. Hubbard of Buckingham and Cumberland; B. W. L. Blanton of Cumberland, and H. M. White of Buckingham.

ATHABASCA CENTRAL.—Application is made to the Dominion Parliament to incorporate this company to build from Edmonton, N. W. T., on the north side of the Saskatchewan River, to Athabasca River; thence north to the mouth of House River; northeast to Clearwater River at Fort McMurea; northwest to a point on the Red River; thence north to a point near Vermillion Falls on Peace River and northeast to Fort Smith on Slave Lake; also from a point near Fort Smith to Fort Churchill, on Hudson Bay, or from Black Lake at the head of navigation, and from Lake Athabasca to Fort Churchill. C. W. Cross of Edmonton, N. W. T., is Solicitor.

ATLANTA, KNOXVILLE & NORTHERN.—Thomas McFarland and John Shea of Knoxville, Tenn., are reported to have the contracts for improvements in the vicinity of Ducktown, Tenn., which include about six miles of new track around the mountain at Hiwassee. (Dec. 15, 1899, p. 871.)

BELLEFONTE CENTRAL.—The company has located an extension from Graysdale, Pa., to Graysdale washer, one-fourth mile. (Official.)

CALIFORNIA ROADS.—Coggins Bros. of Igera, according to report, will build a railroad about six miles long from Coles, on the Southern Pacific near the northern State line, to run to their sawmill property. There is a rise of about 1,400 ft. in three miles.

CENTRAL VERMONT.—An officer writes that there is no truth in the report that the Stanstead, Sheffield & Chambly Co. will build an extension southeast to Coaticook, Que. (Dec. 29, p. 901.)

CHESAPEAKE & OHIO.—The Greenbrier & New River is a proposed branch of about six miles from Hawk's Nest, W. Va., to Butcher's Branch. D. A. Langherne of Fayette, W. Va., has the contract.

CHICAGO GREAT WESTERN.—An extension will be made next spring, according to report, from Dodge Center, Minn., west about 60 miles to Mankato, paralleling the Chicago & Northwestern.

Another extension, according to report, will be made from St. Paul, Minn., to run northwest about 60 miles to St. Cloud, paralleling the Great Northern.

CHICAGO, ROCK ISLAND & PACIFIC.—Surveys are reported in progress for a new line from Drakesville, Ia., to run southwest to Kansas City, Mo., which reduces the distance between Chicago and Kansas City by about 30 miles. The tracks of the Hannibal & St. Joseph are now used from Cameron, Mo., to Kansas City.

DANVILLE, PAXTON & NORTHERN.—Surveys are reported begun for the line of this company, recently incorporated in Illinois, to build from the south line of Vermillion County northeast from Danville and Paxton to the north line of Ford County. H. B. Walter of Danville, Ill., is making surveys. A. C. Daniel of Danville is President and General Manager. (Dec. 8, p. 853.)

EVANSVILLE, SUBURBAN & NEWBURGH.—It is proposed to extend this line which runs from Evansville, Ind., east to Newburgh, still further east 22 miles to Rockport.

LAKE SUPERIOR & ISHPERING.—Surveys are reported in progress for an extension west about 50 miles to L'Anse, Mich., on Keweenaw Bay, and possibly to the copper district.

LAUREL FORK.—This company is incorporated in West Virginia with a capital stock of \$100,000, to build a railroad from the mouth of Laurel Fork of Cheat River in Tucker County, to run south to the head waters of the creek in Randolph County. The principal office is Hendricks. James W. Bowman, Chas. B. Clark and H. F. Colebank of Hendricks are incorporators.

LOCKHART.—About eight miles of grading is reported completed on this company's line from Jonesville, S. C., on the Southern, to run east 15 miles to Lockhart shoals. The company was incorporated in September. John C. Carey of Spartanburg, and Alfred H. Foster of Union, S. C., are incorporators. (Sept. 15, p. 650.)

LONG ISLAND RAILROAD TERMINAL.—This company was incorporated in New York state Dec. 30, with a capital stock of \$500,000, to build a line in the interest of the Long Island from Laurel Hill, Borough of Queens, New York City, to Newtown Creek, two miles. Among the directors are Henry V. Palmer of Brooklyn; Harvey A. Harrold, New York City, and A. W. Bingham, East Orange, N. J.

LAKE SUPERIOR & MENOMONIE VALLEY.—This company was incorporated in Wisconsin, with a capital stock of \$100,000, to build a line from Hayward, on the Chicago, St. Paul, Minneapolis & Omaha, to run south about 60 miles to a point in Barron County supposed to be Cameron.

MABIE, MIDDLEFORK & ADDISON.—This company was incorporated in West Virginia Dec. 27, with a capital stock of \$150,000, to build a railroad from Mabie, Randolph County, on the Roaring Creek & Charleston, to run southeast about 40 miles to Addison, Webster County. The incorporators are: W. H. Mabie, C. A. Mabie and Jay Fleming, Mabie, W. Va.; John G. Stephenson, Pittsburgh, Pa.; Alex. McClure, Allegheny, Pa.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—As the result of a conference in Montreal between officers of this line and T. G. Shaughnessy, President of the C. P. R., it was decided to build a number of extensions in the spring in North Dakota as an offset to encroachments on the territory of the company by the Northern Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—See Railroad News column.

OCILLA & WORTH.—The Ensign-Oskamp Co. of

Worth, Ga., is building a railroad from Ocilla, Ga., on the Georgia & Alabama, to run west 12 miles via Mystic to Irwinville. About six miles is completed.

PENNSYLVANIA.—Arrangements are completed, according to report, for an extension of the Altoona Division from Williamsburg, Blair Co., Pa., to run northeast about 20 miles to Petersburg on the main line.

PENNSYLVANIA ROADS.—About 12 miles of new track are to be laid in the yards of the Carnegie Steel Co., Ltd., at Duquesne, Pa., in connection with the new mills to be erected at that point.

PEORIA & PEKIN UNION.—An officer writes that his company has not made application for additional right of way on Grove St. in Peoria, Ill., as reported. (Dec. 8, 1899, p. 853.)

PHILADELPHIA & READING.—Surveys are reported in progress for a new coal and freight line around the city of Reading, Pa., which will reserve the main line through Reading for passenger trains only. One proposed route begins at Tuckerton, five miles north, and passes around the eastern section of the city, connecting with the main line at Exeter.

ROCKAWAY VALLEY.—Haines Bros. of New York, and F. A. Melick of Morristown, N. J., are reported to have acquired a controlling interest in this property and will make the proposed extensions from Morristown northeast 19.5 miles to Paterson, and from Whitehouse southwest 11 miles to Flemington. This is the same route as that proposed by the New Jersey Midland, incorporated last year by John E. Melick of Morristown. (June 16, p. 439.)

SHEFFIELD & TIONESTA.—This company was incorporated in Pennsylvania Jan. 2, with a capital stock of \$235,000, to build a line from Sheffield, Warren County, to Kellettville, Forest County, 23½ miles. The directors are: Truman D. Collins (President), Mary S. Collins, Jabez B. Collins, E. S. Collins, Nebraska; Orton Figgins, Hickory; Freeman R. Lanson, Tionesta, and James T. Brennan, Warren.

SOUTHERN PACIFIC.—Grant Bros. of Los Angeles, Cal., are reported to have taken the contracts for improving the line between Santa Barbara, Cal., and Elwood. (Nov. 17, p. 801.)

TAVARES & GULF.—An extension is proposed from Clermont, Fla., south about 100 miles to Braid-entown.

GENERAL RAILROAD NEWS.

BOSTON & ALBANY.—The stockholders on Dec. 27, by a vote of 186,652 shares to 15,971, ratified the proposed lease of the line to the New York Central. The New York Central stockholders the following day gave a unanimous vote in favor of the lease. By the terms, as modified, the B. & A. is to receive \$5,500,000 in 3½ per cent. debenture bonds of the Central, and 8 per cent. annual rental on its capital stock. The term of the lease is reduced to 99 years and is subject to approval by the Massachusetts Legislature. (Dec. 1, p. 836.)

CHICAGO & EASTERN ILLINOIS.—The stockholders on Dec. 27 voted to buy the Evansville, Terre Haute & Chicago and the Indiana Block Coal RR. (Dec. 8, p. 854.)

CHICAGO & GRAND TRUNK.—Formal notice is given that the first mortgage bonds which matured Jan. 1 cannot be paid. President Hayes recommends holders of first and second mortgage bonds to deposit the same without delay with Glyn, Mills & Co., under the reorganization plan of Oct. 17. The interest coupons due Jan. 1 were to be paid on that date. (Nov. 10, p. 788.)

CHICAGO & NORTHWESTERN.—Notice is given that enough of the sinking fund bonds of 1879, both 5 and 6 per cent., will be drawn by lot Jan. 31 at the rate of 105 and accrued interest, to absorb the sum of \$144,526 deposited in the sinking fund with the Farmers Loan & Trust Co., trustee, interest to cease from that date.

CHICAGO, BURLINGTON & QUINCY.—Sealed proposals will be received up to Jan. 15 for as many Denver extension bonds due Feb. 1, 1922, as will absorb the sum of \$83,972, under the agreement of Dec. 1, 1881.

CHICAGO, MILWAUKEE & ST. PAUL.—Seventy-six income sinking fund convertible 5 per cent. bonds have been drawn by lot for payment at 105, with accrued interest, on Feb. 2, interest to cease on that date.

FLORIDA CENTRAL & PENINSULAR.—The stockholders on Dec. 27 voted in favor of the consolidation with the South Bound RR. Co. under the title of the Florida Central & Peninsular Consolidated Ry. This is preliminary to the further consolidation into the Seaboard Air Line. Dutch stockholders owning 22,000 shares were represented by Everts, Choate & Beaman in opposition to the consolidation. Thomas F. Ryan of New York served notice on the stockholders that suits were pending in the Federal Courts of North Carolina and Virginia to prevent the consolidation of roads in which he is interested with the Seaboard Air Line. (Dec. 22, p. 888.)

GRAND RAPIDS, BELDING & SACINAW.—The property of this company, successor to the Lowell & Hastings, has been leased to the newly consolidated Pere Marquette Co., taking effect Jan. 1. The line runs from Freeport, Mich., north 12½ miles to Lowell, and has just completed an extension from Lowell north about 17 miles via Vergennes and Smyrna to Belding on the Detroit, Grand Rapids & Western line of the Pere Marquette.

KANSAS CITY, PITTSBURGH & GULF.—Three judgments were given in the Federal Court at Kansas City, Mo., on Dec. 30 favoring this company as follows: Against the Kansas City & Northern Connecting, \$66,183; the Omaha, Kansas City & Eastern, \$24,738; the Omaha & St. Louis, \$26,904. These sums are in payment of money advanced by the K. C. P. & G., for the expenses of these other lines when operated under the system known as the "Port Arthur Route" between the dates of Sept. 17, 1897, and April 1, 1899. (Dec. 29, 1899, p. 902.)

Chas. H. Chappell of Chicago and James Hopkins of St. Louis, on Jan. 2 at St. Louis, Mo., were appointed receivers for the Omaha & St. Louis, the Omaha, Kansas City & Eastern and the Kansas City & Northern Connecting. The intention is to

make these three companies an integral part of the new K. C. P. & G.

MONONGAHELA RIVER.—Substantially all the stock of this company has been acquired by the Baltimore & Ohio, which formerly controlled the road. The minority stock will be taken on the same terms as the majority stock. The \$700,000 first mortgage bonds guaranteed by the B. & O. are undisturbed, but the coal mortgage of \$1,500,000 will be reduced to \$1,000,000. The lands will be leased to the Monongahela Coal Co., which was formerly affiliated with the railroad. The line runs from Fairmont, W. Va., to Clarksburg, 31.2 miles.

NEW YORK, NEW HAVEN & HARTFORD.—The Massachusetts Railroad Commissioners have given permission to issue \$230,800 of stock and \$245,000 of bonds for improvements on the Norwich & Worcester line, including a new station to cost \$5,000 at Jewett City, Conn.; \$30,000 for grade crossing at Auburn, Mass., and new tracks between Norwich and Groton.

NORTHERN PACIFIC.—Judge Sanborn, in the U. S. Circuit Court at St. Paul, Minn., on Dec. 28 filed an order discharging Edwin McHenry and Frank G. Bigelow as receivers of the old company. The property and affairs are turned over to the stockholders of the reorganized company. The receivers are retained only to look after suits against them as receivers which have not been settled. (Dec. 15, p. 872.)

PHILADELPHIA & READING.—A car trust deed for \$3,600,000, dated Dec. 26, 1899, has been filed in Philadelphia with A. T. Stotesbury of Drexel & Co., lessor and trustee. The trust runs for 7½ years with interest at 4 per cent., payable semi-annually. The principal is to be paid in 13 semi-annual payments of \$250,000 each, the last one being \$324,000. These payments will be made from the renewal fund of the company. The trust covers 2,500 wood coal cars, 1,000 gondola cars, 30 passenger coaches, 30 locomotives, 500 box freight cars and 200 refrigerator cars.

PORTLAND & ROCHESTER.—The Boston & Maine took possession of this property on Jan. 1, and the accounts will hereafter be incorporated with those of the parent company. It is to be operated as an extension of the Worcester, Nashua & Portland Division, and the duties of the officers which have charge of that division are extended over the new line. (B. & M., Dec. 8, 1899, p. 854.)

PULLMAN COMPANY.—Judge Tuthill of the Superior Court at Chicago, Ill., on Dec. 30 refused to issue the injunction prayed for by Truman A. Taylor, a stockholder of the Pullman's Palace Car Co., to prevent the merging of that company and the Wagner Palace Car Co., on the ground of insufficient reason. The property of the Wagner Palace Car Co. was transferred at noon on Dec. 30 to the new Pullman Co. (Pullman's Palace Car Co., Dec. 8, 1899, p. 854.)

RALEIGH & GASTON.—Stockholders of the Louisville RR. Co. on Dec. 23 refused to sell their road which forms part of the R. & G., to the new Seaboard Air Line system.

ST. PAUL & DULUTH.—Clarence S. Day of the firm of Clarence S. Day & Co., New York, has issued a circular to common stockholders of the St. P. & D., stating that a money syndicate of \$7,000,000 has been formed in the interests of the common stockholders to buy their stock at \$50 per share, and to give to each holder the privilege of becoming a member of the syndicate, with the right to subscribe thereto to the extent of 60 per cent. of the par value of their holdings of the stock. The syndicate, through the purchase of all the company's lands, will then arrange to take up and cancel the preferred stock now outstanding. A majority of the common stock has been bought by the syndicate at \$50 per share. The minority stockholders may deposit their stock with Clarence S. Day & Co. Those who wish to become subscribers to the syndicate will pay an installment of 25 per cent. of the amount they subscribe. This arrangement is to hold up to Jan. 15. (Oct. 6, p. 702.)

SIOUX CITY & NORTHERN.—This property, which was sold at foreclosure at Iowa City Dec. 12, passed on Dec. 31 under the control of the Great Northern. (Dec. 29, p. 902.)

TOLEDO & OHIO CENTRAL.—The control of this property by the Hocking Valley was definitely announced last week. Under the plan of reorganization of the H. V., \$5,000,000 each of common and preferred stock of the H. V. was set aside to control the T. & O. C. and the Columbus, Sandusky & Hocking. Of this new stock, \$4,000,000 preferred and \$4,421,600 common has been applied to the acquisition of the entire issue of \$3,421,000 of 3 per cent. collateral trust convertible bonds of the Middle States Construction Co., for which a majority of the capital stock of the T. & O. C. was pledged with the Central Trust Co. Of this new issue of stock \$3,150,700 common and \$1,453,700 preferred has been exchanged by the Construction Co. for \$1,812,100 preferred and \$4,080,000 common stock of the old T. & O. C. The balance is held by the Construction Co. in trust to acquire the additional \$1,815,571 common stock on the basis of \$70 Hocking Valley common for \$100 T. & O. C., and \$1,896,000 preferred stock for the T. & O. C. on the basis of \$70 Hocking Valley preferred for \$100 T. & O. C. preferred. There is also \$1,219,100 new preferred stock of the H. V. held in trust by the Construction Co. to acquire car trusts of the T. & O. C., and to make advances for additions and improvements on that property. The new officers of the T. & O. C. are given under Elections and Appointments.

TOLEDO, ST. LOUIS & KANSAS CITY.—The bondholders have unanimously voted to adopt the plan of reorganization recently detailed in this column. (Dec. 29, p. 902.) There is a proviso placing the minimum price of the bonds at 130, plus interest at 4 per cent. to the date of sale, in case they must be sold because of unexpected delay after Jan. 1.

WESTERN MARYLAND.—The City Council of Baltimore on Dec. 26 revoked its decision to pay at maturity the \$375,000 of third mortgage guaranteed bonds due Jan. 1, but holders are notified that the Commissioners of Finance as trustees of the sinking fund will buy the same at par when presented to the City Register on and after Jan. 2. This action is on account of certain legal complications. (Dec. 22, p. 888.)



FRIDAY, JANUARY 12, 1900.

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Contributions.

The Signal Engineer.

To the Editor of the Railroad Gazette:

I have read with interest your excellent editorial in the Railroad Gazette of Jan. 5 on "The Signal Engineer." I have no fault to find with it in general, but I wish to bring out a few points which you have either overlooked or have not treated as fully as perhaps they ought to be treated.

Of the greatly increased appropriations for new structures and works that the railroad managers of the country have had the pleasure of spending, since the revival of activity in business, probably the proportion going to the signal department would show as large an increase over previous allotments as would that of any other department. The department is not a great one, measured by money used, when compared with other expenditures, but expenditures for new fixed signals are now made with more intelligence and liberality than ever before.

On some important roads the signal engineer continues to be kept in the extreme background if, indeed, he is not conspicuous by his entire absence; but if the experience of those roads which were first to establish signal departments is to be accepted as a guide, this neglect to put at the head of this work a capable engineer, who shall make signaling his chief or only business, is a decided mistake.

The signaling department demands a strong man at its head, for the reason that while it has to do directly with the safety of trains and the prevention of costly collisions, the art of signaling is comparatively new, and practice is not well settled. The head of such a department needs to be free from the care of other matters and to have time to read, think and study. Again, this department is important because it is widely scattered, and therefore difficult to superintend. On a road of 6,000 miles, or even one of 2,000, the signaling plants are likely to be widely scattered, and a signaling plant frequently assimilates too much with those it lives with. If you have crossing signals in conjunction with ten or twenty different roads, it is likely that in the matter of design, construction and maintenance you are being pulled in at least five or ten different directions away from your own standards. Even with neighbors left out, there are constant hindrances, on a large road, to the maintenance of uniform standards, in consequence of the very different conditions of traffic on the different parts of the road—the thin lines and the busy ones.

The signal engineer should be a competent lieutenant to the Chief Engineer. The neglect of maintenance and of high discipline has been a crying evil in the signaling work on more than one American railroad and a noticeable defect on many. This has in all probability been due in large degree to the fact that the engineer's department was overworked before it began to consider signals. Chief Engineers—and General Superintendents also—seem destined to continue overworked, so that it is not reasonable to expect that unbusinesslike signal departments will be speedily reformed without a change in the theory of management. There is ample scope for an energetic, well educated signal engineer on most roads. This officer must be a student, because his art is constantly developing; and also because he should be able to train his subordinates. He ought to be able to advise Division Superintendents, for the signal engineer knows a good many things that Superintendents do not fully appreciate—especially where

one signal engineer traverses the territory of a dozen Division Superintendents.

The signal engineer who has mastered the science and art of his profession and who has the confidence of his superiors has a wide field before him. He may rightfully devote part of his energies to larger problems than efficiency of mechanical devices and economy of operation. He should be able to offer suggestions as to how fast his road should increase its investments in signals. I have heard of roads expending money for signals injudiciously, being perhaps hurried forward by a supposed public demand, or led into extravagance by an undue adherence to the theory of uniformity. The independent signal engineer cannot afford to be guided by precedent except with his eyes wide open. Perhaps the most immediate tangible benefit that a railroad ought to get from employing a signal engineer is the proper balance between thoroughness and cheapness.

A large part of the signal apparatus in use in this country has been put in according to the ideas of the makers or sellers rather than those of the user; the railroad manager has not been in a position to define his own wants and to call upon rival makers to fill them. Men who sell signals to railroads say that in devices whose value or cost has become settled, competition has, during the past six years, destroyed all the profit. This is not a normal state of things, and it is one function of the signal engineer to see that the purchasing agent does not go too far in the pursuit of his kind of economy.

S. E.

The Modern Steel Rail.

To the Editor of the Railroad Gazette:

It may be rather late to make any comments on your editorial in the issue of October 6th, 1899, on the "American Society Rail Section," but as the rail question is one of the most important that railroads have to consider, perhaps some further discussion may result in good. I am much pleased at the very large amount of rail now rolled of the Society pattern. From figures given it would appear that at least 75 per cent. of all the rail used by the most important roads is now of that section, and this would seem to indicate that in the near future practically all rails of 70 lbs. per yard and over would be of that pattern.

I have had no personal experience with the Society rail, as we have but just begun to use it on the lines with which I am connected, and so can only speak from theory and report, but I am firmly convinced that this section is the best ever rolled, in weights of 70 lbs. and upward. Below 70 lbs. per yard the head has always seemed to me to be a little too thin for good service.

The reasons given by you why the Society section should be better than the old standards are sound and good, and there occur to me two other reasons which, perhaps, are just as good: First, the rail is certainly much stronger than most, if not all, of the old standards, and better able to resist the effects of heavy, rapidly moving locomotives and cars. I think the trouble arising from surface-bent rails will be entirely eliminated if the track surface is fairly well kept up, and that the number of broken rails will be greatly reduced. The second reason why the Society rail should be better is one that, from an operating standpoint, is of great importance. There is no doubt but that the broad flat head of the American Society pattern will add materially to the tractive power of locomotives and permit an appreciable increase in train tonnage. The importance of this ability to increase tonnage without increasing the size and weight of the locomotive, every transportation officer knows.

I am surprised at what you say in regard to a reaction from the use of the heavier pattern rails, and believe that if this is so it is only temporary and limited in extent. So far as I know of railroads in the middle west they are not reducing their sections, but as rapidly as possible are substituting rails of from 80 to 90 lbs. per yard for the lighter patterns. I do not know very much about the 100-lb. sections, but believe if there has been any dissatisfaction with it, it is partly the fault of the mills in not properly rolling it and partly the fault of a section which cannot be properly handled by the mill. If the Society pattern is used and the mill work properly done, I believe the 100-lb. rail will prove just as good and serviceable as the lighter sections.

With the very heavy locomotives, some of them having as high as 193,000 lbs. on the drivers, and the 100,000 lb. capacity freight cars, and the high speed at which it is now necessary to run almost all classes of freight, the heavy rail has come to stay, and railroads instead of going back to lighter sections must replace all their light rails as fast as possible. The light rail section might answer the purpose if our railroads were constructed on a permanent way, but as they are not, we must at least partially overcome the defects of roadbed by the use of heavy rails which will be capable of distributing the load over several ties without injury or liability to surface bending.

As to the quality of the rails now being rolled and ways and means for improving it, a great deal more

could be said than would be permissible in an article of this kind. There is no question but that the rails turned out of the mills to-day are inferior to those of fifteen or twenty years ago. On the other hand, I do not think it fair to lay all the blame on the mills because the rails now rolled will not carry so great a tonnage as the rails rolled in 1880. The rails laid twenty years ago were subjected to light power and cars, and few and slow trains as compared with to-day. In 1880 there were few locomotives with over 100,000 lbs. on the drivers, the cars were of 40,000 lbs. capacity or less, the number of trains, light as they were, was much smaller than now, and the speed about one-half as great. The effect of these trains and movements on the rail when new was very different from the effect now, and without doubt is responsible for a considerable part of better wearing qualities of the rails of long ago. The proposition confronts us, however, that the rails of 1899 are inferior to those of 1880, when from the nature of the burden imposed on them they should be made better, and the great question with the railroads to-day is how to procure a better rail than they are getting.

I am quite of your opinion that there is more in the physical treatment of the rail than in its chemistry. The best American rails seem to have been made between 1876 and 1882, and at this time there was very little uniformity in the chemical analysis of Bessemer steel, yet the rail was uniformly good, showing conclusively that it was not the chemistry, but the physical treatment that made the good rail.

At that time the usual practice in making rails was about as follows: The pig from the blast furnace was remelted in cupolas and blown in converters, much slower and in smaller quantities than now. The ingots were allowed to cool, and charged into horizontal furnaces, where they were slowly reheated, and were bloomed into blooms in thirteen passes through the rolls. These blooms were allowed to cool and then again slowly reheated and rolled into rails by thirteen passes in a train of rolls running about 400 ft. per minute.

In the modern mill practice the iron, when reduced in the blast furnace, instead of being molded into pigs, cooled and reheated, is run fluid from the furnace to a mixer and passes, still in a fluid state, into the converter, where it is blown hard and fast. The steel from the converter is cast into ingots, charged into a heating furnace and held there until ready for blooming. The ingots are bloomed into blooms in eleven passes through the rolls; the blooms, while still hot, are again charged into the heating furnace and are rolled into rails with nine passes in a train of rolls running 900 ft. per minute.

Keeping the metal constantly hot, never allowing it to cool or come to rest molecularly may not make any difference in the quality; some engineers claim it does and others that it does not. The rapidly moving rolls reducing the ingot to the bloom much faster and with fewer passes than in the old rolls may not affect the quality of the rail, as the metal is handled at a higher temperature while it is more plastic than formerly. The principal fault with the modern mill practice lies in the fact that with the fewer passes and faster speed of train, the rail is finished too hot. In the present practice the finishing pass is reached while the metal is still at a temperature of from 2,000 deg. to 2,200 deg. F., while formerly it was finished at a temperature of from 1,400 deg. to 1,600 deg. F.

If steel is allowed to cool without working it will be coarsely crystalline in structure, while if it is constantly worked from the time it becomes plastic at about 2,600 deg. F., until it cools to a temperature of about 1,300 deg. F. (after which it becomes too solid to work without injury), the structure will be finely granular throughout.

I believe if the users of steel rail will not only provide the best known chemical specifications for the metal but also specify that it shall be constantly worked between the temperatures of 2,600 deg. and 1,300 deg. F., the result will be a good and satisfactory rail, even better than that of 1880, inasmuch as the American Society pattern is better than the old standards, and that this good rail can be obtained without difficulty in 100-lb. sections.

ENGINEER.

The Bids on the Atbara Bridge.

In the December Proceedings of the Engineers' Club of Philadelphia is a paper by Mr. Richard Khuen, Jr., on the Atbara River Bridge. Among other information we find the following facts about prices and terms of delivery, which we do not remember to have seen collected before.

In response to the call for aid, the British Egyptian Government made inquiries in England early in October concerning this piece of construction. A promise of one year for shop-work and one year for erection was all that could be obtained. The reason given by the British manufacturers for this very slow work was the overcrowded condition of their shops. Second tenders were then asked of two American and five British firms, speedy delivery being the main consideration.

This table gives the names of firms, prices, and time of delivery promised:

United States.	Liver- pool.	New York.	Delivered in	
			Liver- pool.	New York.
Maryland Steel Co.,.....	Cts. 2.55	Cts. 2.30	Months, 4	3 1/4
Union Bridge Co.,.....	2.95	2.66	3 1/4	2 1/4
England.				
Horsley.....	2.89	.....	3 1/4	.....
Head, Wright & Co.....	3.00	.....	6-9	.....
Joseph Westwood.....	3.22	.....	4 1/4	.....
Patent Shaft and Axle Co.,.....	3.05	.....	6 1/4	.....
.....	3.42	.....	5 1/4	.....
Thames Iron Co.,.....	3.45	.....	5-6	.....

These tenders, together with plans, reached Egypt the latter part of December, 1898. It was then found that, since the bidders contemplated the use of false-work for erection, the work of erection could not be prosecuted until after the summer floods, and could, therefore, not be completed until the following winter or spring, which would mean the loss of a year. Accordingly, new bids, based on cantilever erection or launching, were asked for from all the firms already mentioned, to which was added the Pencoyd Iron Works. The following bids were received, the Patent Shaft and Axle Company being the only British firm responding to the final call:

Patent Shaft and Axle Co., 3.37 cts per lb.	First span delivered in Liverpool in 2 months, and the rest each in 3 weeks (total 6 months).	
Maryland Steel Co.,..... 2.3	"	3 1/2 months in New York.
Union Bridge Co.,..... 2.79	"	65 days in New York.
Pencoyd Iron Works,..... 2.5	"	42 days in New York.

The Pencoyd Iron Works, allowing two weeks for shipment to Liverpool, promised the delivery of the work in one-third of the time asked for by the British firm and at a much lower price per pound. However, the price per pound of the Maryland Steel Company was slightly lower, but the time was more than twice that of the Pencoyd Iron Works.

Momentum Grades.

By C. Frank Allen.*

The letter on Velocity Grades in the Railroad Gazette of Dec. 8 prompts me to write something on this subject. The principle involved in the use of velocity, or momentum grades is, of course, this: Of the pull or tractive force exerted by the locomotive when in motion, part is used in overcoming the ordinary level tangent resistances (including journal, rolling and atmospheric), part on curve resistance, part on grade resistance, and if these do not consume the entire tractive force, what is left acts to produce an increase in the speed of the train. That is, this unbalanced part of the pull acting through a

actual profile, if we add to the actual height at any point the "velocity head" due to the speed at that point, we thus find what we may call the "virtual height" at that point, and a series of "virtual heights" connected give a "virtual profile," and from this we can find the "virtual grades." These "virtual grades" measure the resistances to be overcome by the locomotive in addition to the level tangent and curve resistances. It is evident that the effect of the actual grade is taken into account since the actual grade is used in determining the virtual grade. The matter can better be understood by examples.

(a.) Let the full line in Fig. 1 represent an actual profile. A train is assumed to pass Station O at a speed of 15 miles an hour, to proceed at the same speed to Station 10, and continue at the same speed to Station 15. The velocity head for 15 miles = 7.99. The "virtual height" at Station 0 then = 17.99. At 10 the speed is the same, and the virtual height therefore the same. The "virtual grade" is level, and the locomotive has to overcome only the level tangent and curve resistances. At 15 the actual elevation is 17.50, and for the same speed of 15 miles, the "virtual height" is 25.49; the "virtual grade" is parallel (i. e., equal) to the actual grade of +1.50 per 100, so that in passing from 10 to 15, the locomotive has to overcome a grade of +1.50 per 100 in addition to level tangent and curve resistances. The pull of the locomotive evidently must be greater here from 10 to 15 than it is from 0 to 10.

The road may be operated, however, so that the locomotive will exert a uniform pull from 0 to 15, having a speed of 15 miles an hour, however, both at 0 and 15. The virtual heights will be at 0, 17.99; and at 15, 25.49; a rise of 7.50 in 15 stations, or +0.50 per station, so that the "virtual grade" under this method of operation is +0.50 per 100. At 10, the "virtual grade" line is at elevation 17.99 + 5.00 = 22.99, or 12.99 above the actual profile at 10. But 12.99 is the "velocity head" for a speed of 19.1 miles per hour. The locomotive which leaves Station 0 exerting on a level track the pull necessary for a +0.50 grade, pulls between 0 and 10 more than the amount of the level tangent and curve resistances, and the surplus pull serves to raise the speed from 15 miles to 19.1 miles. From 10 to 15 the pull due to a +0.50 grade is insufficient for the actual +1.50 grade, but here the train parts with some of its surplus energy, loses velocity and yet reaches Station 15 with a speed of 15 miles per hour.

(b.) Similarly in Fig. 2, assume as conditions that the train passes Station 0 at 25 miles per hour, and reduces speed to 10 miles per hour at Station 60. The locomotive is to exert a uniform pull.

The virtual elevation at 0 = 20.00 + 22.20 = 42.20.

The virtual elevation at 60 = 60.00 + 3.55 = 63.55.

The virtual grade will be $\frac{63.55 - 42.20}{60} = +0.356$ per 100.

The velocity head at 20 = 42.20 + 7.12 - 10.00 = 39.32.

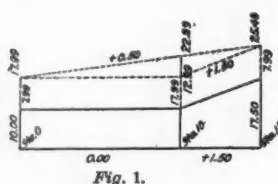


Fig. 1.

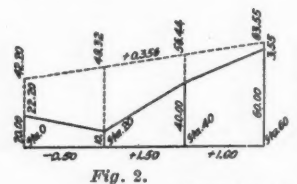


Fig. 2.

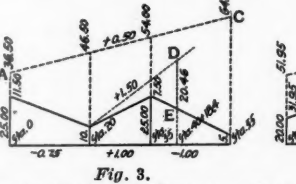


Fig. 3.

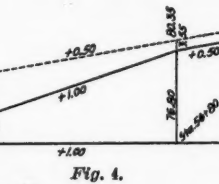


Fig. 4.

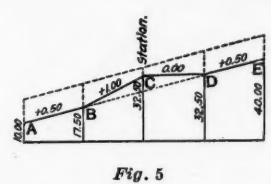


Fig. 5.

Examples of the Application of Momentum Grades—Allen.

definite distance accomplishes work which finds its equivalent in the increased energy possessed by the train, and this is expressed in terms of velocity. In a similar way, when the pull of the locomotive is insufficient to cover the resistances on tangent, curve and grade, this deficiency exists through a definite distance acting substantially as a retarding force. Now to meet this, work must be done, and this can be accomplished only by drawing on the energy of the train due to its velocity, and in yielding energy the train suffers loss of speed. Thus, a train starting upon a grade, at a speed of 20 miles an hour and ending at 5 miles an hour, can climb a hill steeper than would be possible at constant velocity.

A proper understanding of the subject may be had by using the method of "virtual heights" and "virtual grades," following Wellington's general method. It is well understood that any body to which velocity has been imparted, has acquired energy sufficient to cause it to rise (barring resistances) to a height given by the well known formula $h = \frac{v^2}{2g}$. This becomes for

velocities in miles per hour $h = 0.033445V^2$, and to this should be added an allowance for the energy due to the rotation of the wheels about their own axes. Wellington finds this to add 6.14 per cent. to the result, making the formula $H = .0355V^2$. The height thus found is the "velocity head" and Wellington, p. 335, gives a table (No. 118) for finding heights ("velocity heads") corresponding to velocities.

Knowing the elevations of the various points on the track, we have the actual profile. Having the

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The velocity head at 40 = 42.20 + 14.24 - 40.00 = 16.44. The speed at 20 = 33.3 miles, and at 40 = 21.5 miles per hour.

The principle of "momentum grades" has been made use of mainly in connection with steep grades. The train is operated so as to pass the foot of the grade at high speed and reach the summit at very low speed; in this way the rate of "virtual grade" becomes much less than that of the actual grade, but it is the "virtual grade" which is the effective "maximum grade" and which measures the resistance that the locomotive must overcome. That the principle involved is an important one, and should be made use of in many cases, goes without saying. That "momentum grades" should be used indiscriminately in original location admits of serious doubt. To the writer it appears that there are serious objections to placing complete dependence on the use of momentum on grades for several reasons.

First.—The necessity for stopping or even slowing down (either at the bottom or any point on the grade) would interfere with the operation of the grade by momentum, and a stop or a slowing down might be necessary from several causes:

1. A track gang at work relaying track.
2. A bad bridge, unsafe at high speeds.
3. Bad weather and cautionary orders.
4. Cattle or other obstruction on the track.
5. Signals out of order or fog.

Second.—It is objectionable to acquire a high velocity at a sag for several reasons:

1. Broken wheels are more commonly found at the foot of long grades than elsewhere.
2. At high speeds in passing the sag, the shock

upon the draw gear is severe, and vertical curves to avoid this are impracticable. Wellington's rule requires for a -1.00 grade succeeded by a +1.00 grade, a curve extending 40 stations each side of the vertex, with a consequent raising of grade from vertex to curve of 20 vertical feet.

3. Train discipline on freight trains cannot be maintained if orders are given that a speed of 15 miles an hour shall not be exceeded except at (the most dangerous places) sags in the line.

Third.—On very long grades the difference in "velocity heads" will be distributed over so great a distance that the resulting decrease in "maximum grade" (from actual to virtual) will be comparatively small; while on very short grades it is often possible (and certainly preferable) to reduce the actual grade.

Fourth.—There is always a material advantage in keeping any grade somewhat lower than the maximum, because train loads are seldom constant throughout an entire division, and any special piece of steep grade may happen to occur at the place when the train must haul its heaviest load, and a grade lower than maximum would allow a slight increase of load to be carried on any train over that portion of the division, and so increase the capacity of the entire division.

For these reasons the writer would always be slow to make use of "momentum grades" (for effecting a practical reduction of the maximum) on original location. In revising line, however, where conditions of traffic and operation are well established, a failure to take advantage of the principle, on grades which could not be reduced, would sometimes result in largely increased cost of operating. The "momentum grades" would then be made use of, not from definite preference, but as the lesser of two evils, because a failure to so use them would result in something worse, small train loads over an entire division the other parts of which would allow satisfactory and economical working.

The writer urges that in no case should the "momentum grade" be accepted as a matter of course, but it should in each case be taken into consideration by the engineer, who can then accept or reject it in view of the special circumstances existing, exercising that "engineering judgment" which in this, as in all engineering questions, considers the practical bearings in connection with the mathematical conclusions, and in view of evidence of various sorts, determines what is the wise procedure.

(c.) The "virtual profile," however, is capable of more extended usefulness than has thus far been shown. On any profile, as in Fig. 3, a "virtual grade" line AC may be drawn with an inclination which marks the maximum grade at which a locomotive can haul its train at uniform speed (or which represents the pull which it is intended it shall exert). The distance from the actual profile to this grade line then shows, by the "velocity head," the speed at any given point.

In the figure, for instance at 0, assume velocity = 18 miles, then at

20, vel. head = 46.50 - 10.00 = 36.50 and vel. = 32.1 miles.

35, vel. head = 54.00 - 25.00 = 29.00 and vel. = 28.6 miles.

55, vel. head = 64.00 - 5.00 = 59.00 and vel. = 40.8 miles.

(d.) In a similar way it is shown that another engine can haul its train on a grade of +1.50 per 100 without losing velocity. In Fig. 3, the train is assumed to have stopped at Station 20, and so will leave it from a state of rest. At what point will it have acquired a speed of 24 miles an hour? Obviously, at the point where DE = 20.46, which is the "velocity head" for 24 miles an hour. This will be at Station 40 + 18.4.

(e.) Similarly in Fig. 4, a train starts from 0 with a speed of 30 miles an hour. The grade is to be a momentum grade. The locomotive can pull its train on a +0.50 grade without change of velocity. When its speed is reduced to 10 miles an hour, it must proceed without further loss of velocity, and therefore the actual grade beyond this must not exceed +0.50. At what point will its velocity be reduced to 10 miles an hour? Evidently at Station 56 + 80, where the difference in elevation between the actual and virtual grades is 3.55, which is the velocity head for 10 miles an hour.

(f.) In one special direction the principle of "virtual grades" can be made use of to considerable advantage, and this is in original location at stopping points. In many cases it may be predicted that all or nearly all trains will stop at each way-station. The operation of the railroad will be facilitated and economy result if the track at the station be placed at a higher elevation than would be proper if no

station was there. For example, in Fig. 5, instead of the straight line for a uniform grade of +0.50 from A to E, make the grade BC = +1.00 and CD level. From the figure it can be seen somewhat more effectively than without it that the speed of a train from either direction will be checked as it approaches C for a stop, and thus less expenditure of braking force will be necessary. In leaving C in either direction, not only will the grades allow easier starting of the train, but velocity will be acquired much more rapidly than if the profile had followed the dotted line from B to D. The statement has been made that it was at one time proposed for the elevated railroads of New York City to place the stations at the summit of grades from either side. The idea failed of adoption probably because such an arrangement would require more exercise of leg muscle on the part of the patrons of the road in mounting to the stations.

There are many possible applications of this principle of "virtual grades" besides those mentioned. Superintendents in making time charts could determine definitely the effect of actual grades in limiting the speed of trains, the time required for acceleration of speed in leaving stations, but it is not the purpose of this letter to exhaust either the subject or the reader.

To the writer it seems very desirable to acquire a knowledge of principles in some such fashion as above, rather than to use a formula simply by substituting values, often without understanding the principles involved. This view of the matter will furnish an excuse for the space occupied in attempting to outline one method of treating the interesting subject of "momentum grades." The writer uses the profile. A train is assumed to pass Station O at a term "momentum grade" in preference to "velocity grade" which occurs in the article of Dec. 8. Neither term is very scientific, but "momentum grade" has been more used, probably than "velocity grade." The term "virtual grade" is good, but not as suggestive.

Ten-Wheel Tandem Compound Passenger Locomotive of the Atchison, Topeka & Santa Fe Ry.

[WITH AN INSET.]

In our issue of June 16, last, there was very fully described and illustrated the first of five tandem compound consolidation locomotives designed and built by Mr. John Player, Superintendent of Machinery of the Atchison, Topeka & Santa Fe, and August 4 there was shown an earlier design of a tandem arrangement for an eight-wheel locomotive and another design for converting a single expansion mogul into a tandem ten-wheel compound. Neither of the last two plans was ever carried out by Mr. Player, owing to his leaving the roads for which they were intended, before the designs were finished. While the general features of these tandem compounds were worked out for other roads reaching back to 1886, it has only been since Mr. Player's connection with the Santa Fe that such locomotives have been built. In this work Mr. George A. Hancock, the Assistant Superintendent of Machinery, and Mr. G. E. Stolpe, Chief Draftsman, have taken leading parts. The tandem compound freight locomotives have now been running on the mountain divisions of Colorado and New Mexico since 1898, and show a saving over similar simple engines of about 13 per cent. of water and 20 per cent. of coal.

Recently a ten-wheel passenger locomotive has been built at the Topeka shops which embodies the essential features of the former tandem compounds, but in several matters of detail the design has been improved and simplified. All the illustrations, excepting Figs. 5, 6 and 7, will be found on the inset. The appearance and general features of this locomotive are shown by the accompanying engravings, Figs. 1 and 2. It weighs in working order 169,000 lbs., 123,000 lbs. being on the driving wheels. The cylinders are 14 and 24 in. by 28 in., the steam pressure is 200 lbs., and the driving wheels are 77 in. in diameter. The tender loaded weighs 96,000 lbs. and has a capacity for 5,000 gallons of water and 8 tons of coal. The boiler is of the extended wagon top type with a total heating surface of 1,923 sq. ft., there being 1,758 sq. ft. of heating surface in the tubes, which are 14 ft. 2 in. long, and 165 sq. ft. of heating surface in the firebox;

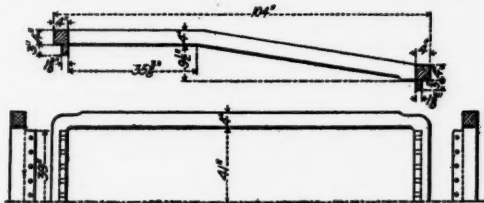


Fig. 5.—Cast Steel Mud Ring.

the grate area is 26.5 sq. ft. The more interesting details are shown by separate drawings.

Fig. 3 gives the arrangement of the springs and equalizers and the dimensions of the main frames, which are of cast steel; the front rail, also cast steel, is shown in Fig. 4. Attention is called to the straight

spring hangers, the steel casting which forms the fulcrum for the forward equalizer and also a brace between the top and bottom bars of the frame, and the manner in which the firebox is supported. This latter arrangement especially is different from usual practice. The mud ring, Fig. 5, is of cast steel and at the front and back has projections 3 in. deep and 39 in. long which are bolted to cast steel cross braces or furnace anchors as shown in Fig. 6. These anchors in turn fit over the frames at each end and are held by three bolts which pass through a filler, placed in a slot in each frame; the slots being longer than the fillers, the firebox is free to move forward or back while held rigid against vertical movements. In this way the anchors answer the same purpose as expansion pads, and, in addition, form strong frame braces. Other interesting steel castings are the guide yokes shown in Figs. 7 and 8.

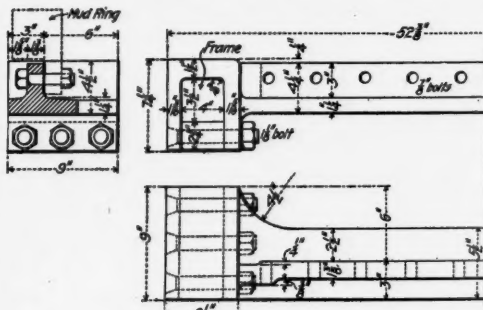


Fig. 6.—Cast Steel Furnace Anchors.

Fig. 9 shows clearly the arrangement of the pistons and how the high-pressure piston rod is inserted in and keyed to the low-pressure rod. The spiders, and followers of the pistons are of cast steel. The valves and valve gear are clearly shown by Fig. 10.

The valves are of the hollow piston type made of cast iron without packing rings, the high-pressure valves being 8 in. and the low-pressure 12 in. in diameter. These work in cast iron bushings which in turn are mounted in valve cages cast with the cylinders; in previous designs the valve cages were separate parts bolted to the cylinders. Both high and low-pressure valves have outside admission with 1 in. outside lap and 6 1/4 in. travel in full gear. The high-pressure valves have 1/4 in. inside clearance and the low-pressure valves are line and line inside. All valves are set to be line and line in full gear and the link radius is 50 in. Deducting the cross-bridges, these piston valves give openings equivalent to straight ports 1 1/4 in. wide, and 19 in. long for the high-pressure and 23 1/2 in. long for the low-pressure valves.

The distinctive feature of the valves is the absence of packing rings; and the means for varying the cut-off of the high-pressure with reference to the cut-off of the low-pressure cylinders, for a given position of the reverse lever, is the important feature of the valve gear. This is accomplished by raising or lowering the back end of the high-pressure valve stem upon the rocker arm which works both valves. This arm is made the arc of a circle of which the

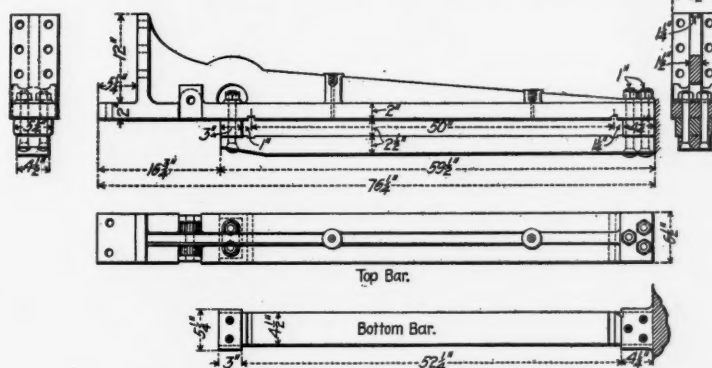


Fig. 7.—Cast Steel Guides of Tandem Compound.

pin joint in the high-pressure valve stem is the center. The low-pressure valve stem is rigidly attached to the rocker, but the high-pressure stem is connected through an adjustable block held in place by a set screw and gib; this adjustment cannot be made from the cab. As shown, the low-pressure valve rod is hollow and through it the solid, high-pressure rod works. This arrangement of valve gear has been patented by Mr. Player.

The arrangement of the cylinders and saddle is shown in Fig. 11. In tandem compounds built before by the Santa Fe the high and low-pressure cylinders were mounted on separate saddles, but in this one a single saddle casting is used to which all the cylinders are bolted. This enables a front end to be used, Fig. 12, similar in dimensions to that of a simple engine. It will be seen from Fig. 11 that all the main steam passages are in the saddle and that the auxiliary steam supply for the low-pressure cyl-

inders at starting is brought through a 1 1/4-in. pipe directly back of the saddle; this supply is controlled by a secondary throttle in the cab. The main steam passages lead from the branch pipes to both ends of the valve chambers of the smaller cylinders, and, as was said, the valves are hollow. The large exhaust passage on each side, between the high and low-pressure cylinders, is clearly shown and its subsequent division so as to deliver steam at both ends of the low-pressure valve chambers; a large passage for the low-pressure exhaust leads to the exhaust nozzle. The saddle and cylinder castings are carefully lagged.

This locomotive has been in service about two months upon the Topeka Division and promises to fulfil all the expectations of its designers. A second locomotive, the duplicate of the one shown, is now building at Topeka.

The following is a list of dimensions other than those previously given:

Gage	4 ft. 8 1/2 in.
Kind of fuel to be used	Bituminous coal
Wheel base, total, of engine	25 ft. 2 in.
" " driving	14 ft. 6 in.
" " total (engine and tender)	51 ft. 11 1/2 in.
Length over all, engine	38 ft. 4 1/4 in.
" " total, engine and tender	63 ft. 4 1/4 in.
Height, center of boiler above rails	8 ft. 11 1/2 in.
" of stack above rails	15 ft. 0 in.
Drivers, material of centers	Cast steel
Truck wheels, diameter	28 in.
Journals, driving axle, size	9 x 10 in.
" truck axle, size	5 1/2 x 10 in.
" rod, diameter	H. P., 3 in.; L. P., 4 in.
Kind of piston rod packing	Metallic
Main rod, length center to center	8 ft. 7 1/2 in.
Steam ports, length	H. P., 19 in.; L. P., 23 1/2 in.
Exhaust ports, length	H. P., 19 in.; L. P., 23 1/2 in.
" width	4 in.
Bridge, with	2 1/2 in.
Valves, kind of	Piston plug; H. P., 8 in. diam.; L. P., 12 in. diam.
" greatest travel	6 1/4 in.
" outside lap	1 in.
" inside clearance, H. P.,	1/4 in.; L. P., line and line
" lead in full gear	Line and line
Boiler material in barrel	Carbon steel
thickness of material in barrel	1/2 in. and 1 1/4 in.
" diameter of barrel	Front, 60 in.; back, 68 1/2 in.
Seams, kind of horizontal	Sextuple butt
" circumferential	Double lap
Thickness of tube sheets	Front, 3/4 in.; back, 1 in.
" crown sheet	1 1/4 in.
Crown sheet stayed with	T bars, sling stays
Dome, diameter inside	30 in.
Firebox, length inside	7 ft. 11 in.
" width	3 ft. 4 1/4 in.
" depth front	73 1/4 in.
" back	53 1/4 in.
" material	Firebox steel
thickness of sheets	Side and back, 3/4 in.
" brick arch?	Yes
" water space, width, front,	4 in.; sides, 4 in.; back, 4 in.
Grate, kind of	Finger rocking
Tubes, number	237
" material	Charcoal iron
" outside diameter	2 in.
" length over sheets	14 ft. 2 in.
Smokebox, diameter	60 in.
" length	72 1/4 in.
Exhaust nozzle	Permanent
" diameter	4 1/4 in.
" distance of tip above center of boiler	3 in.
Netting	Wire
" size of mesh	2 x 2 in.
Stack	Taper
" least diameter	13 1/4 in.
" greatest diameter	17 in.
" height above smokebox	4 ft. 2 in.
Tender	
Type (6-wheel or with swivel trucks)	Swivel
Tank capacity for water	5,000 gals.
Coal capacity	8 ton.
Kind of material in tank	Tank steel
Thickness of tank sheets, sides,	1/4 in.; top and bottom, 3/8 in.
Type of under-frame, wood or iron	Iron

Type of truck Arch bar, with cast steel bolster
Truck with swinging motion or rigid bolster, Rigid bolster
Type of truck spring Elliptic
Diameter of truck wheels 33 in.
Diameter and length of axle journals 5 x 9 in.
Distance between centers of journals 62 in.
Diameter of wheel fit on axle 6 1/2 in.
Diameter of center of axle 5 1/2 in.
Type of truck bolster Cast steel
Type of truck transom Cast steel
Length of tender frame over bumpers 21 ft. 4 1/2 in.
Length of tank 19 ft. 9 1/4 in.
Width of tank 9 ft. 1/2 in.
Height of tank, not including collar 5 ft.
Height of tank over collar 5 ft. 4 in.
Type of back drawhead G. A. Hancock combination
With or without water scoop Without

Names of Makers of Special Equipment.

Sight-feed lubricators Nathan
Front and back couplers Trojan
Safety valve Crosby
Sanding devices Leach
Injector Nathan
Driver brake equipment Westinghouse
Tender brake equipment Westinghouse
Air pump Westinghouse
Air pump governor Westinghouse
Steam gages Crosby

Automatic Block Signaling.*

By Edward C. Carter, Chief Engineer, Chicago & Northwestern Ry.

The present development of automatic signals in the United States has been the result of years of experiment and trial, through which at last success has been achieved. The earliest application of this class of apparatus which was in any degree successful was in 1871, but no great advance was made until the years 1883-84 and 1885, when over 650 automatic signals were installed, and in the years 1886 to 1899 inclusive 5,834 were put in service. . . .

The semaphore taken abstractly is the type of signal which would undoubtedly commend itself to the large majority. This preference is based on the one feature of its greater visibility, and if this were the governing feature in the selection of an automatic signal it would unquestionably go a long way toward placing the semaphore first.

The primary and most essential requisite in an automatic signal is that it shall give the desired indications correctly, at the same time being subject to the least possibility of derangement, and that, always on the side of safety to the traffic to be protected. A secondary and important requirement is that an automatic signal shall be fairly economical in the consumption of the power required for its operation. Another requirement is that the original cost of installation and the subsequent cost of maintenance shall not be excessive.

Inasmuch as block signals are a means by which a runner receives information as to the condition of the line ahead without being obliged to stop to get such information, their value is dependent upon the clearness with which their indications are displayed. In comparing the semaphore and disc signals, there is practically no difference in the distance at which their indications can be seen for two-fifths of the time, that is, during the night. The same is true in time of fog or heavy storms day or night; it is again true on lines of heavy curvature day or night. Therefore, as block signals have their greatest value at night, in time of fog or storm, and on crooked lines, it would appear that the supposed advantages of the semaphore are more fancied than real. There is also no little force in the argument that so far as possible automatic signals should differ from those used in interlocking, and as the first cost of the enclosed disc is less and the consumption of power for operation is less than for the semaphore, there are many who prefer this type of signal. The objections to the enclosed disc are:

- 1. That the case can be covered by a damp, sticky snow and the signal obscured;
- 2. That the glass can be broken and the disc stem bent by a missile thrown at the signal;
- 3. That the face of the case may reflect the sunlight at such an angle as to render the signal indication indistinct during a portion of the time a runner is approaching it.

The disadvantages of the automatic semaphore are:

- 1. It may be frozen in the clear position by a wet snow falling and freezing on the blade and the connection between the blade and its support;
- 2. Its greater first cost and consumption of power for operation;
- 3. The greater liability of derangement of the semaphore as at present installed and the consequent necessity for a larger and higher skilled force of maintainers.

As regards the weight of these objections to the respective types of signal, that of snow covering the face of an enclosed signal case may lead to detention of traffic, but under the rule that an imperfectly displayed signal is to be regarded as a stop signal, it cannot lead to a dangerous condition. Regarding the second objection to this type of signal, it is an occurrence most unlikely to be experienced in such a way as to escape the notice of a runner, for the signal would have to stick at just the right point in order to avoid being improperly displayed. Regarding the third objection, there will always be a certain space through which the runner passes in approaching the signal in which the signal can be observed without its being obscured by reflection.

In the case of the semaphore:

- 1. Heavy counterweighting will reduce the chance of the signal being frozen in the clear position, but, better still, the use of a system of circuits in which the signal stands normally at stop and is cleared by the approaching train itself (providing the condition of the block is such that it should give a clear indication). With such a circuit the chances are that the signal would be frozen in the stop position and not in the clear, and would thus avoid the positively dangerous condition of giving a clear signal when the block might not be clear. If frozen in the stop position it would be neither better nor worse than the enclosed disc under similar conditions.
- 2. As regards the greater cost for installation and operation of the semaphore type, it is one that should not be considered if the company making the installation is convinced that the semaphore has decided advantages over the disc.
- 3. As regards the greater liability to derangement, this may in time be overcome by improvements in the apparatus.

* Extracts from a Report on the question of Automatic Block Signaling; being subject No. XXV. for discussion at the sixth session of the International Railway Congress.

A reference to the table given hereafter shows that opinion in the United States is about evenly divided on the question of the superiority of the enclosed disc against the exposed semaphore. The table also shows the extent to which automatic signal operation has developed.

Of the automatic block applications in the United States much the greater part are operated through a track circuit, about one-half being operated on the so-called "Normally danger" system. Where home block signals have no corresponding distant signal, the circuits for the home signal overlap the home signal of the next block so that a train is well within the protection of the signal of the second block before the home signal of the preceding block is allowed to clear.

The statistics regarding the operation of automatic signals indicate that no more reliable means of guiding trains has been devised. On the Chicago & Northwestern Railway, during a period of fifteen months, with 203 blocks, there were 4,062,340 signal operations due to trains. During this time there were 844 stops required by the signals due to all causes, or one stop to 4,813 signal operations. Of the 844 stops, 446 were due to broken wires, broken battery jars, and material which was defective; 62 were due to malicious interference with the system; 107 were due to neglect on the part of maintainers; 151 were due to accidental causes (lightning, maintenance of way men breaking bond wires, etc.) and 78 were due to causes unknown. Taking the case of all stops from all causes, it appears that for the 844 stops 20,000 trains were run through the 203 blocks (204 miles), or that of 24 trains each running 204 miles through 203 blocks, one is stopped once on its trip. Reduced to trains per day, this means that for an average of 44 trains there would be 1.8 stops per day. During the above period there were 8 reported cases of the signals having indicated cars on sidings that might foul the main track, broken rails and open switches. During the seven years these signals have been in use there has been only one false clear indication per 900,000 to 1,000,000 signal operations.

Automatic Signals in the United States 1883 to August 1, 1899, inclusive.

Year installed.	Clockwork home.		Enclosed disc.		Electro-pneum semaphore.		Electric semaphore.		Total.
	Home.	Distant.	Home.	Distant.	Home.	Distant.	Home.	Distant.	
1883.....	12	.....	.....	.....	.....	.....	.....	.....	12
1884.....	434	.....	.....	.....	32	33	.....	.....	499
1885.....	151	.....	.....	.....	.....	.....	.....	.....	151
1886.....	26	.....	.....	.....	.....	.....	.....	.....	26
1887.....	122	17	3	.....	.....	.....	.....	.....	142
1888.....	46	.....	.....	.....	.....	.....	.....	.....	46
1889.....	20	.....	.....	.....	23	22	.....	.....	65
1890.....	31	.....	.....	.....	81	86	.....	.....	248
1891.....	70	.....	.....	.....	63	65	.....	.....	229
1892.....	58	240	6	272	276	.....	.....	.....	852
1893.....	61	195	5	244	214	.....	.....	.....	719
1894.....	16	356	66	.....	.....	.....	.....	.....	438
1895.....	122	36	.....	.....	.....	.....	.....	.....	158
1896.....	301	28	.....	.....	.....	.....	.....	.....	327
1897.....	430	350	219	213	12	6	.....	.....	1,241
1898.....	66	27	77	85	78	39	.....	.....	372
1899.....	334	115	135	115	62	7	.....	.....	971
Totals....	1,055	2,137	837	1,149	1,114	152	52	.....	6,496

The American Railway Association has adopted the following definitions of terms to assist in the understanding of requirements and rules for operation of trains under automatic block signals, and as the definitions and requisites of installation represent the consensus of opinion of the best railway managers of the United States, they are given as showing what is considered safe practice. [These are already well known to our readers, therefore we do not reprint them.—Editor.]

The safe use of automatic block signals is dependent upon the maintenance of the highest state of discipline among the train operating force. This can only be attained by a rigid adherence to the rules under which the system is to be operated and the establishment of such efficient supervisory methods as will admit of the prompt detection of infractions of such rules. It is essential to the establishment of confidence in the reliability of the system that each case of a train being stopped should be reported promptly, to the end that the signal, if out of order, may be repaired in the shortest time, reducing the number of trains that would be unnecessarily stopped by it. Should a large number of stops be occasioned at certain signals by trains in the block ahead, a revision of the schedules may be desirable, or such a relocation or increase in the number of the block signals as will permit of an uninterrupted train movement. Such a complete record of all stops should be kept as will admit of a knowledge being had of each signal's performance and of the difficulties experienced in each case, together with the remedy applied. The tabulation and classification of these difficulties will give the most valuable information on which can be based the improvements which will lead to their elimination.

The rules under which the majority of the automatic signals in the United States are operated correspond so closely with those formulated by the American Railway Association that these latter rules are here given. [Not reprinted here.—Editor.]

Maintenance.

The organization of the Maintenance Department of Automatic Signals on the Chicago & Northwestern Railway may be taken as representing the general practice in this country. The signal engineer has a corps of maintainers, battery men and lamp men. A maintainer has charge of the inspection, maintenance and repairs of about forty blocks, the signals and apparatus being distributed over twenty miles of double track. His wages will average \$75 per month. A battery man has charge of the maintenance and renewal of the batteries for about twenty blocks together with other duties in the line of assisting the maintainer. His wages will average \$45 per month. The lamp man has the care of filling, cleaning and lighting the signal lamps for about twenty blocks, and is required on occasion to assist the battery man. His wages average \$30 per month.

A maintainer is required to ride over his entire district twice each day observing the operation of all of the signals. He is required to investigate, repair and report any case of irregularity in the operation of the signal system which comes under his observation or which is referred to him. He is required to so arrange his work that he shall have inspected carefully and in detail every part of the apparatus in his charge at least once every thirty days, making such tests of circuits, batteries and instruments as will enable him to detect and remedy conditions which if neglected would result in imperfect operation of the signals. He is held responsible for the care, operation and maintenance of all of the signal apparatus on the district to which he is assigned. In times of storm the entire force is required day or night to be on duty, going over the line and observing that the system is in proper working order.

The battery man is required to have in each battery house a certain per cent. of reserve cells, which he shall have set up and in proper working order, ready to be placed in circuit relieving the same number of worn-out cells. The maintenance of the gravity battery is essentially the same as other Daniell cells, except that instead of the addition of copper sulphate in small quantities from time to time as is the usual custom in renewing batteries on telegraph circuits, batteries for signal circuits have been found to give better results by making a complete renewal of the copper sulphate after emptying the jar and cleaning its elements. The battery man is responsible for the maintenance of the batteries at their normal strength and for their good electrical connection in their respective circuits, and also for the care and distribution of new battery material, old material being saved and returned to the storekeeper. The battery man is required to assist the maintainer so as to be familiar with all the circuits, instruments and methods of detecting troubles and remedying them. He is thus prepared for the duties of maintainer and is in line for promotion when an opening occurs.

The lamp man is required to clean, fill and light the lamps on his district. He has the care of and is responsible for the oil, etc., required, and for the efficiency of his lights; he is required to help the battery man with a view to learning battery work and being capable of assuming a battery man's duties when the opportunity offers. In general, the organization should be such that each man is fitted for the next higher position, and no man should be retained on the force who has not the capacity to acquire the knowledge required to permit of his being advanced.

The average cost of maintenance and operation of automatic block signals on the Chicago & Northwestern Railway for the year 1898 was \$83.61 per signal, made up as follows:

Labor and material on signals.....	\$82.33
" " on batteries.....	30.42
" " on lamps.....	20.86
	\$83.61

Requisites of Installation.

The following points are given as a general guide in the installation of automatic block signals and as an amplification of some of the requisites laid down by the American Railway Association.

Efficiency in operation without extravagance in installation requires the most thorough knowledge of the present traffic requirements and traffic capacities of the line to be signalled.

The traffic requirements taken with the physical characteristics, including station locations and switches, will be the factors determining the lengths of the blocks and the consequent number of signals.

In the determination of the relative length of blocks, the principal factor will be the time required by trains in passing through them. The length determined by running time will be modified by curvature in the line and by the distances between stations and switch locations, the controlling signal being so placed as to give ample protection for switching and station operations. The shortest block should be of a length sufficient for the fastest trains being brought to a stop between the distant signal and its corresponding home signal, or where a distant signal is not used, between the home signal and the far end of the overlapping section controlling the home signal of the preceding block. The

maximum length of block is limited only by the traffic requirements.

All signals should be placed either over or on the runner's side of the track, and the home signals so that they will assume the stop position after the head of the train has passed them. In early applications of automatic signals it was thought to be necessary for the runner to see the signal operate as the result of his train entering the block. The signal had therefore to be far enough within the block for the runner of the fastest train to be able to observe its movement before reaching it, and, as a consequence, on crooked lines and in time of heavy fog the runner of a slow train would find the signal at stop without having seen it assume that position. The result was that he either had to stop under the rules, or, believing that his train had operated the signal, go on with the possibility of finding the block occupied and causing the accident the signals were intended to prevent. This difficulty of correct interpretation of the signal indication is sufficient to condemn the practice of making such a location of a home signal.

Experience has demonstrated that a track circuit for controlling the signals is the best, and, though it has some disadvantages as compared with the wire circuit, still they are more than overbalanced by its affording protection in cases which the wire circuit cannot be made to cover without excessive complication in apparatus. All of the circuits and apparatus should be so arranged that the derangement of any part controlling a signal will cause it to assume and remain in the stop position.

In installation, each circuit should be carefully tested for conductivity and insulation. The resistance of track circuit should not exceed $\frac{1}{2}$ ohm per $\frac{1}{2}$ mile section, and its insulation resistance in dry weather should not be less than 20 ohms, or in wet weather not less than 4 ohms, per $\frac{1}{2}$ mile section. In ordinary practice a 4-ohm relay is used in track circuit and current is supplied by 2 cells of multiple connected gravity battery, the elements of which are zinc and copper rendered active by a solution of sulphate of copper. The average internal resistance of such a cell is about 1 ohm. When the insulation between the rails is 20 ohms, with a combination of circuit and battery resistance, the discharge should be approximately 235 milliamperes, of which the track relay receives about 194 milliamperes. When the insulation between the rails is 4 ohms the total discharge approximates 356 milliamperes, of which the track relay receives about 173 milliamperes. The comparatively slight variations of effective current received by the track relay under the extreme conditions of track insulation above given, insures a fairly uniform pull on the armature of the electro-magnet, and permits of its more accurate adjustment and uniform operation.

All electrical instruments should be tested and proven to be of the proper resistance for their circuits and free from the possibility of crosses. Relays for track circuits should generally be located at the near end of the block and their battery at the far end, as an entering train will thus shunt the current so as to drop the armature of the relay and as the train proceeds, any increase in the amount of accidental foreign current reaching the rails behind the train will not be sufficient to energize the relay so as to close it. Battery for signals should be placed at the end of the line circuit controlling the signal furthest from the signal. This rule also holds for battery for indicators. In general, battery should be so placed with reference to the instrument it is to operate, that a cross between the wires forming the circuit or with foreign wires will not cause a false clear indication.

All line wires should properly be insulated and made up into a cable covered with lead, for, while the first cost may be somewhat greater, the security from crosses, and especially the protection it affords the instruments from the effects of lightning will, with its longer life, repay the increase in the original outlay. A well-proven form of lightning arrester should be placed in each circuit liable to be affected by that form of trouble. All relays should be provided with points so arranged as to give a rubbing contact.

The foregoing, taken with the requirements and rules of the American Railway Association, cover the more important features which should be observed in the installation, maintenance and operation of an automatic block signal system.

In conclusion, it may be said that for lines of heavy traffic, with high speed trains, an ideal system for controlling the movements would be:

"1. Interlocking plants at all points where there are switches in the main tracks, the home or advance signals being electrically slotted with a track circuit through the succeeding block. The towers to be supplied with indicators to give information regarding trains in the adjoining blocks:

"2. Automatic block signals placed as required to properly space trains moving between the interlocking plants."

Such a system will admit of the heaviest traffic movement, with the greatest safety, with the least detention, and at the least cost for protection.

As a result of seven years' experience in the use

of automatic block signals on the Chicago & Northwestern Railway, and exceptional opportunities, as a member of the Safety Appliance Committee of the American Railway Association, for learning the experience of others in their use, the writer is convinced of their reliability and great value for the protection of life and property in railway operation, and has no hesitation in recommending their use when properly installed, maintained and operated.

The Goodwin Steel Car in Collision.

By John M. Goodwin.

I desire to propound a question or two in relation to the interesting articles recently published in your columns, concerning the comparative merits of steel and wood for freight car construction. In your issue of October 13, 1899, was a discussion on the subject of "Metal Draft Beams," with cuts showing a wrecked pressed steel car with malleable iron draft rigging and coupling uninjured. Now I am led to ask the

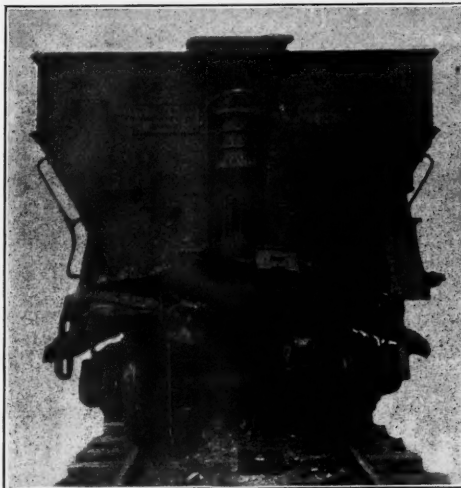


Fig. 1.

following question: After making a coupler and draft rigging as strong as is consistent with economy in ordinary railroad service and every-day accidents, does it not appear that it would be wise to construct the car to which this draft rigging is applied so that the car shall be stronger than the draft rigging, in order that, in case of a severe collision, the car may be saved from severe damage rather than the coupler?

I enclose photographs of a recent wreck of Goodwin cars built of structural steel and malleable iron. A train of 38 cars coasting down the mountains crashed into a heavy mountain mogul locomotive. The locomotive was backing up around a sharp curve running at about 18 miles an hour.

Photograph No. 1 shows the forward end of the first car that was in collision with the locomotive tender. No. 2 shows the damaged end of second car, and No. 3 is the third car with follower plates broken on forward draft rigging only. No. 4 shows rear end of first car and forward end of second car in elevation.

The metal buffer plates and the coupler on the forward end only of each of the three first colliding cars were demolished and torn completely from the draft gear castings. The rear couplers and buffer

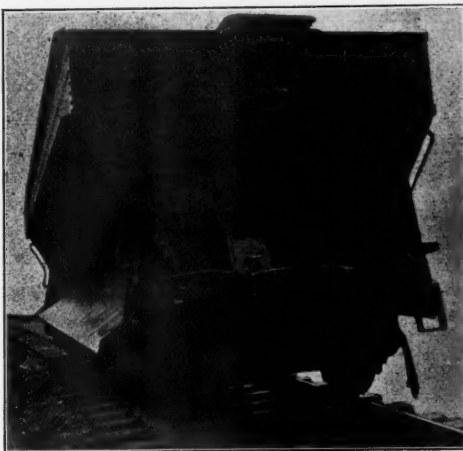


Fig. 2.

plates remained intact and uninjured in each instance.

The sheet steel platform of the car that plunged into the tender was ripped from the malleable castings forming the end sill, the rivets being pulled through the sheet steel and remaining in the castings. The end sill castings were bent and twisted, but remained intact and unbroken. The running gear sustained no damage, and these three cars took the entire shock, remaining on their trucks and on

the rails, with no further damage than here described.

There are but two sills under a Goodwin car; these two sills form a box girder and extend from end to end of the car. They are on the draft line and are the backbone of the structure; the aprons and the side girders very materially stiffen these two

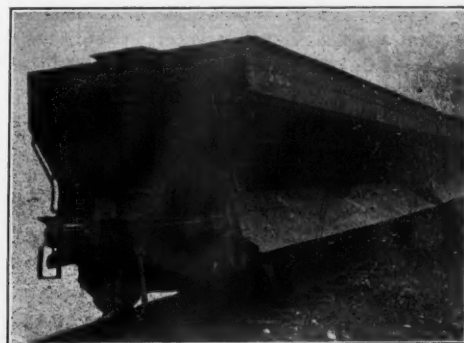


Fig. 3.

sills and tend to distribute the load or strain evenly, however applied, adding to their resistance in all strains brought upon the car either in ordinary service or in case of accidents. Further, these sills form a battering ram in case of collision, the efficiency of which is well demonstrated in the instance under consideration.

The colliding car tore off the coupler from the tender and the two sills crashed completely through the buffer plate and oak end sill of the tender. It required the combined services of two mountain moguls and a heavy hydraulic jack to wrench the car out of the tender, while the comparatively slight damage shown on this one end was all the damage sustained by the car in punishing the locomotive tender so severely.

There are many new features in the construction of the Goodwin car class "G" that I would like to discuss, but I will restrain myself and ask only a few more questions at this time.

Conditions of general traffic being equal, in car building, comparing steel with wood, does the lesser liability, in steel construction, to sustain damage from ordinary accidents, compensate for the increased cost of repairs in steel when damage is sustained? Does not the solution of this question depend materially upon the comparative structural strength of the steel frame with the wood frame? In any structure there is a certain amount of material absolutely necessary to resist a given blow with-

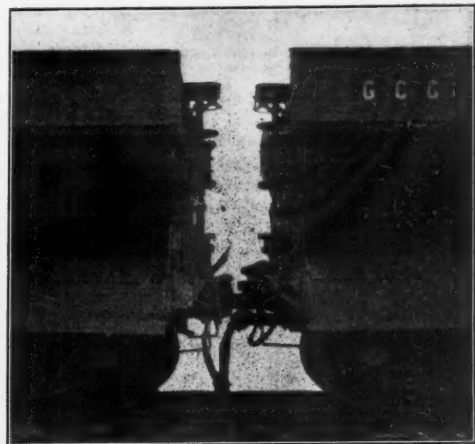


Fig. 4.

out changing the form of the structure. This required amount can be calculated, and when calculations have been made, is it not wise to resist the present tendency to "skimp" in weights, especially when added burden is given to be carried over the figured capacity? In the structure of the Goodwin car can be seen the results of special attention paid to giving sufficient weight and bracing to parts liable to meet with extraordinarily hard usage, and the advantages are evident in the use of malleable iron in small sections, which are easily removed and replaced when bent by accidents. The castings all being numbered and the rivet holes cored in them, require the minimum amount of shop work in repairing.

Thirty years of experimenting has resulted in the present standard, class "G," 80,000-pound capacity Goodwin freight handling car. This car is but little known at present by the railroad men of this country, for the reason that very few Goodwin cars of any one pattern have been built up to the present year. The object of the Goodwin Car Company being to perfect the car before putting out any large quantity. You have noted from time to time within the past few years in your paper, the slow but sure progress made in these cars, demonstrating the revolution in metal construction. The few defects of the

first models have been eliminated in each successive model built and tested until the pattern of the year 1900 has been reached; designated, Goodwin Car, Class "G." These enclosed photographs do not show the latest improvements. They are the car known as class "F," but I trust they will be of interest sufficient to justify reproducing in your columns, as an illustration of a step forward toward the metal car problem which is of general interest to-day.

Closing the Openings in the M. C. B. Knuckle.*

It is recognized by all railroad men that the knuckle is the weakest part of the M. C. B. automatic coupler. This being the case, it is our duty as representatives of railroads to locate the trouble, and, from investigations I have made, I find that a very large majority of failures are due to the pin-hole and link slot in the knuckle. In order to satisfy myself on this point, I had 200 knuckles taken at random from the scrap pile regardless of the cause of the failure, and on inspecting them I found that 60 per cent. had failed through the pin-hole and 11 per cent. through the link slot, or 71 per cent. of all the failures was due to weakness from the pin-hole and the link slot.

On June 30, last, the Illinois Central had 31,997 freight cars equipped with M. C. B. couplers, which brought into use 63,994 knuckles, and during the 12 months ending June 30, 5,768 knuckles were broken, or 9 per cent. of the total in use. As I have just stated, 71 per cent. of the knuckle failures was due to weakness caused by the pin-hole and link slot, leaving 29 per cent. due to other causes. We therefore find that during the 12 months' period, 4,096 knuckles failed on account of the pin-hole and link slot, and 1,672 from other causes. That is, in the operation of 31,997 cars during 12 months, 4,096, or 6.4 per cent. of the knuckles in use, gave way from the cause in question.

I find, from statistics, that there are now in the United States about 1,300,000 freight cars. Assuming, for the sake of argument, that the experience of other roads has been similar to that of the Illinois Central, namely, that 6.4 per cent. of the 2,600,000 knuckles in use fails annually from weakness of the pin-hole and link slot, 166,400 knuckles fail yearly from this cause, which, at the average current price of \$1.65 each, shows a loss to railroads of about \$274,560 per year.

Recognizing the fact that the Interstate Commerce law prohibiting the operating of any car not equipped with automatic couplers will be made effective at an early date, I would recommend that as soon as this law goes into effect, that weakness just mentioned be overcome by closing the pin-hole and link slot, and in doing this I desire to call your attention to another very great benefit to be derived from the change, namely, that of increasing the wearing surface of the inner face of the knuckle, which would very materially prolong its life. With the knuckle as at present, the wearing surface is about 17½ sq. in.; with the link slot closed it would be increased 28 per cent., or to about 22½ sq. in. It is a well-known fact that when the inner face of the knuckle is worn beyond a certain limit, that cars become uncoupled when in motion without disarranging the locking device. The closing of the link slot will improve this condition 28 per cent., having increased the wearing surface to that extent.

The proposed change in the knuckle will increase its weight about 9¼ lbs. and also increase its cost 38 cents, which, however, is insignificant when compared with the saving to be effected. I have shown above that 9 per cent. of all knuckles in use fails annually, and that 6.4 per cent. falls through the pin-hole and link slot, leaving 2.6 per cent., or 67,600 knuckles, failing throughout the United States from other causes. And it is on this number that it would be necessary to pay an increased price of 38 cents each on account of increased weight, or \$25,688; leaving a net saving of \$248,872 per year by closing the pin-hole and link slot in M. C. B. knuckles, to say nothing of the benefit derived from the increased wearing surface.

The New Street Railroad Power Stations in New York City.

Station of the Metropolitan Street Railway Company.

The new power station of the Metropolitan Street Railway Company will soon be entirely completed. It is situated on the block bounded by 95th and 96th streets, First Avenue and the East River, and the general layout of the plant is shown in the accompanying engravings. The building extends 279 ft. along 95th street and 201 ft. 5 in. along First Avenue. Some of the more interesting facts may be noted.

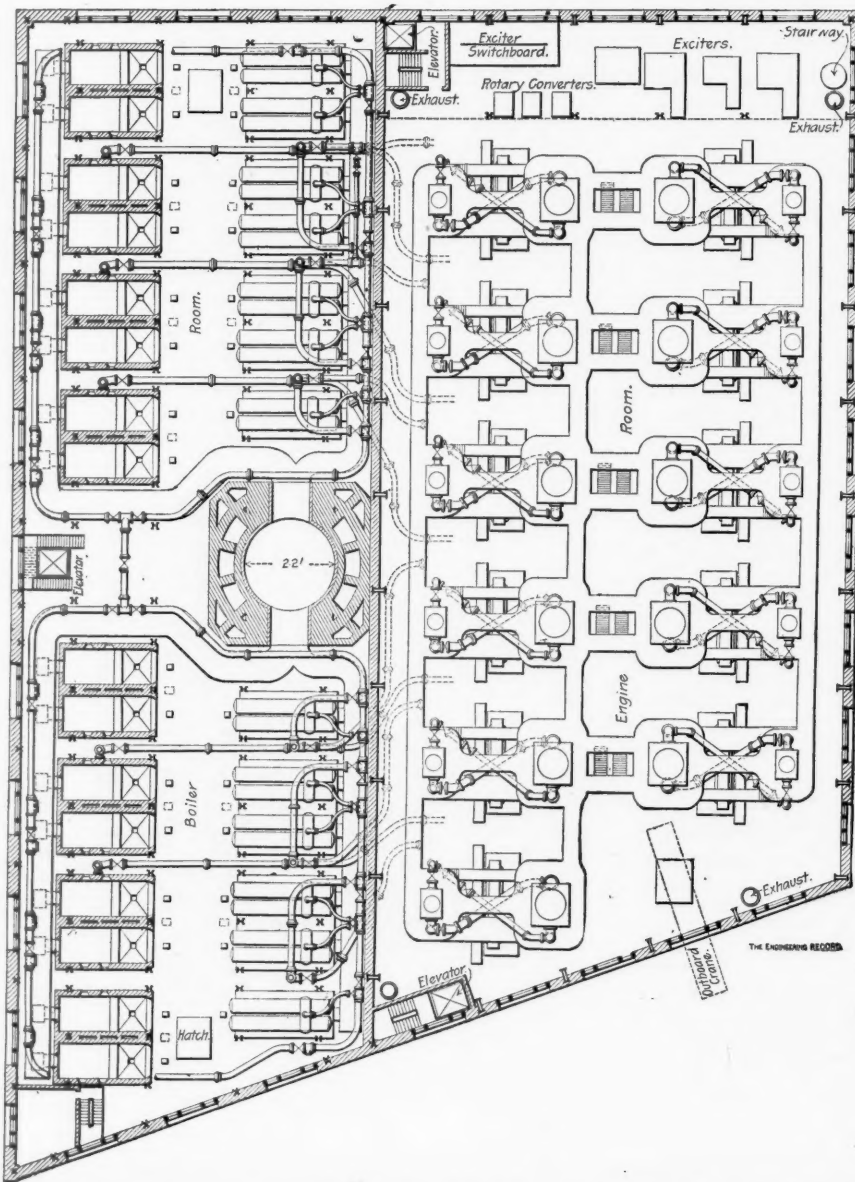
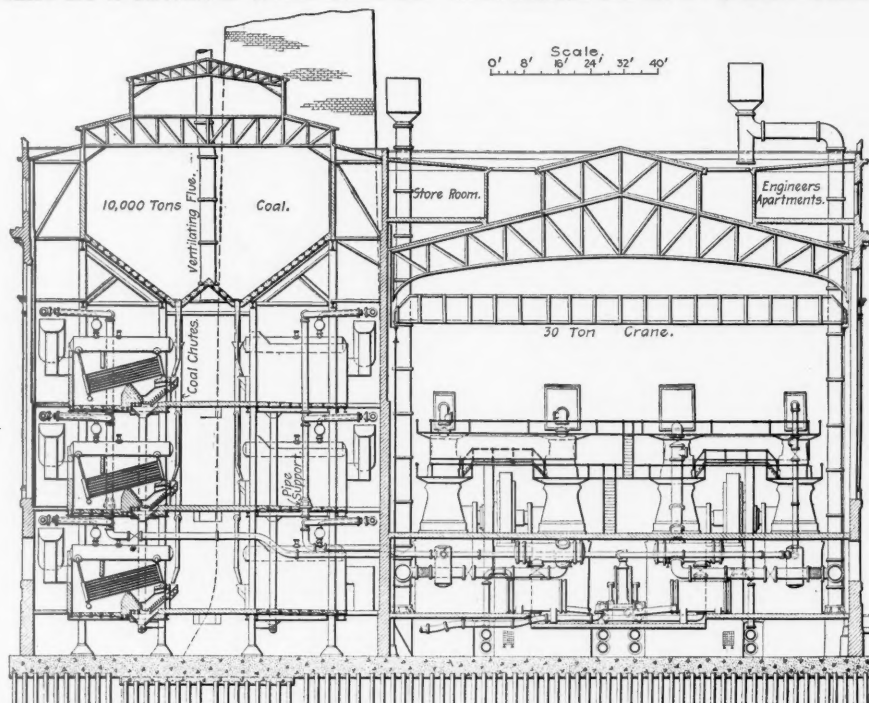
The chimney, which was finished nearly a year ago, is 365 ft. high and 55 ft. square at the base and in its construction 3,400,000 bricks were used. This chimney is laid on 1,300 40-ft. piles driven 19 ft. below high water level. A concrete foundation was then laid

on these, starting one foot below the top of the piles and extending up to high water level, making a total depth of 20 ft. The chimney is square at the base, 55 ft. on a side, and tapers for 20 ft., where it measures 38 ft. 10 in. It retains this dimension for about 60 ft., when it is made cylindrical and gradually tapers to 35 ft. at the top. The entire weight of the chimney is 8,540 tons, making the load per square foot 3½ tons.

The foundations of the building are made of 40-ft. piles at 2½ ft. centers over the whole area, upon which there is a layer of concrete 5 ft. thick under the engine house and 7 ft. under the boiler house. The station is divided by a brick wall into engine and boiler rooms. The boiler section of the power house contains three floors, as shown in the elevation. There are 48 Babcock & Wilcox boilers and

each has a heating surface of 2,665.5 sq. ft. They are fitted with Roney stokers. The steam piping is independent for each engine, and each piping is connected to a loop on the three floors occupied by the boilers. Great care has been taken in all the details of this work. The piping is put together with long bends and is made of extra heavy wrought iron, while the flanges are nearly all of rolled steel. The joints are made of copper gaskets.

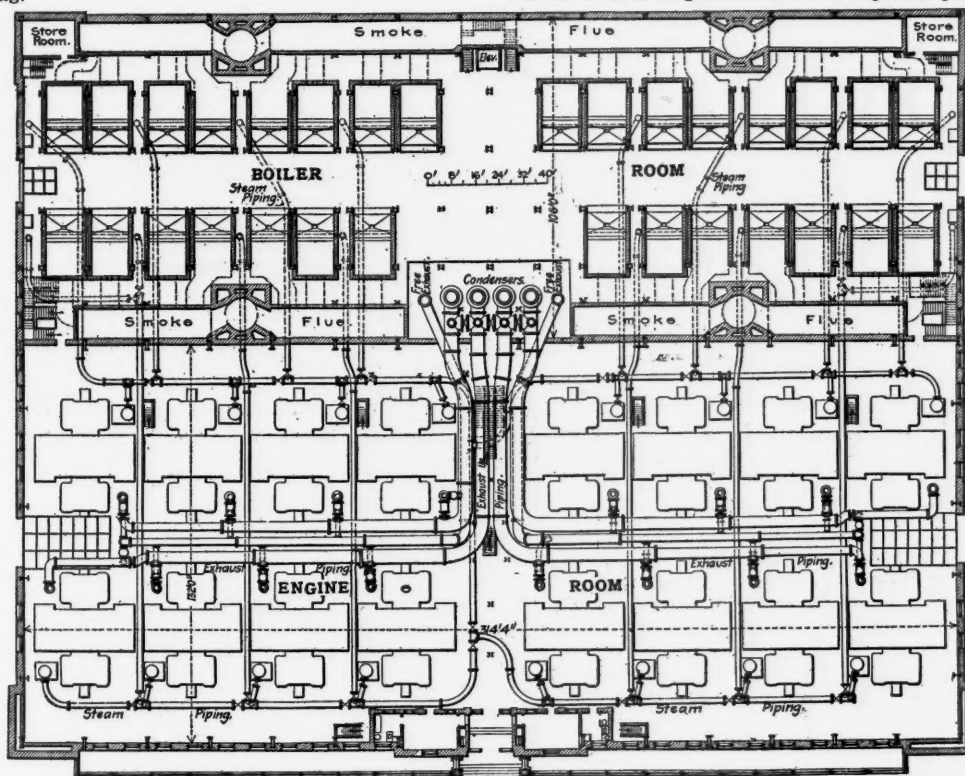
The engine room contains foundations for 11 engines of the E. P. Allis Company's make. These will be vertical cross-compound condensing direct connected types, and five have already been installed. Each engine will develop 4,500 h. p. and the maximum output of the station will be about 60,000 h. p. The high pressure cylinder of each engine is 46 in. in diameter and the low pressure cylinder 86 in.,



Ninety-sixth Street Power Station, Metropolitan Street Railway Co., New York.

*Discussion of Mr. J. W. Luttrell, Master Mechanic of the Illinois Central, before the December meeting of the Western Railway Club.

with a stroke of 60 in. The piston speed is 750 ft. per minute. The engine shaft is of fluid compressed steel, forged hollow. It is 37 in. outside diameter at the fly wheel and 27 ft. 4 in. long. This shaft was made by the Bethlehem Steel Co., Bethlehem, Pa. The fly wheel is 28 ft. in diameter and weighs 300,000 lbs. The wheel is of steel and was cast in 10 sections, with an arm and rim segment in each casting.



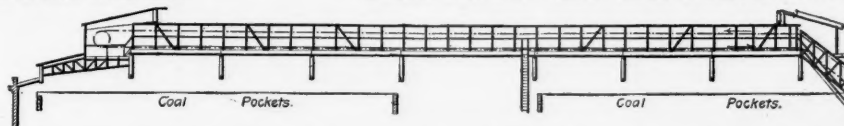
Power Station, Third Avenue Railroad Company, New York.

The condensing water is taken from the East River through an intake built in the river wall. The discharge from each pump may be led either to the river or to a hot well in the basement of the boiler room. Each engine is provided with a Worthington condenser.

Coal is unloaded from boats by machinery in a steel tower on the wharf, shown in the accompanying illustration, and is dumped into a double line of bucket conveyors, which carry the coal to the top of the boiler house, thence along the top of the coal pockets over the boilers and finally delivers it where desired. There are two coal bunkers, each with a capacity of 5,000 tons. From the bunkers the coal is led by chutes to the receiving hoppers of the mechanical stokers. The ashes from the boilers are guided by the chutes to the basement, where they are received by a conveyor, which delivers them into the return buckets of the coal conveying system. The coal handling equipment was supplied by the John A. Mead Co. of New York City.

one for boilers and the other for engines and generators, as shown in the accompanying engraving. The boiler house will be on the river side and will be about 100 ft. high, and on top of this building will be a 10,000 ton coal bin. There will be 60 Babcock & Wilcox boilers arranged in double rows two tiers high and equipped with Roney mechanical stokers. The principal difference from an engineering standpoint between this and the station of the Metropolitan Street Railway Company is that the latter has a high, massive chimney, and in the former mechanical draught will be used.

The engine room has a basement and main floor, the latter being 65 ft. below the roof trusses. The engines are being built by the Westinghouse Machine Company of East Pittsburgh, Pa. They are vertical cross-compound condensing, with cylinders 48 and 86 in. in diameter, with a stroke of 60 in. Each engine is rated at 4,500 h. p. and is to run at 75 revolutions a minute. The maximum capacity of each is about 7,000 h. p. There will be 60 Babcock & Wil-



Coal Conveyor at Metropolitan Street Railroad Power Plant.

The plans of the station were prepared under the direction of Mr. F. S. Pearson, Consulting Engineer, and Mr. M. G. Starrett, Chief Engineer of the Metropolitan Street Railway Co. Mr. C. E. Corby, Assoc. Mem. Am. Soc. C. E., carried out the details of the design, and the construction of the building and the installation of the machinery, respectively, were in charge of Mr. William Low and Mr. A. S. Mann. The steel was supplied by the New Jersey Steel & Iron Co. of Trenton, N. J. We are indebted to the Engineering Record for the accompanying illustrations.

Station of the Third Avenue Railroad Company.

The general layout of the Third Avenue Railroad station at 216th street and Ninth avenue, on the Harlem River, is shown in the accompanying illustration. The power plant is to contain machinery of 70,000 h. p., but will be capable of producing, if necessary, a maximum of 100,000 h. p., which it is believed will be the largest generating station in the world. The foundations are now being laid and will consist of a continuous layer of concrete from 7½ to 8 ft. thick. The site was excavated to an average depth of 14 ft. for a length of 360 ft. and a width of 260 ft. About 16,000 oak piles 12 in. x 40 ft. have been driven in rows 20 x 30 in. center to center. These piles were sawed off at the surface of the excavation, which was then excavated 6 in. deeper before the concrete was deposited. The concrete is of Portland cement 1, 2 and 4, and is mixed

cox water tube boilers capable of being worked at 200 lbs. pressure.

Coal will be taken from boats by machinery in a tower on the wharf and discharged into a hopper, from which it will be sent in chutes by gravity to crushers, depositing it in conveyors. The large quantity of water encountered in the excavation was removed by two 4-in. and two 6-in. Morris sand pumps. Usually, two pumps, having a combined capacity of 2,000 gal. per minute, have been sufficient for the drainage.

Westinghouse, Church, Kerr & Co. are the engineers for this station. The work is being done by Isaac A. Hopper & Son, Mr. William Reeves being in charge. The construction of the power station is under the direction of Dr. Louis Duncan, Chief Engineer, and Mr. John H. Robertson, General Superintendent of the Third Avenue Railroad Company. George B. Francis, M. Am. Soc. C. E., is Consulting Engineer.

Foreign Railroad Notes.

The advance in the import duty on pig iron, which has been made by the Russian Government since 1886, has produced a remarkable expansion in the iron and coal mining industries of the Empire. In 1887 the rate of duty on imported pig iron was increased from 15 kopecks per pood to 25, and this resulted in rapidly increasing the number of furnaces, until in 1897 there were 25 plants, producing 62,000,000 poods (1,119,534 tons) annually. This has stimulated

the mining of coal in the Donetz basin, where now 70,000,000 poods (1,263,990 tons) of coal are produced annually. Ten new coke companies have been formed and they have 1,000 ovens. All kinds of manufactures in which iron is used have multiplied rapidly, and 65 new establishments are reported. All this refers, apparently, to central Russia; and the cities in this part of the Empire have increased in population during the ten years very rapidly. In many towns the number of inhabitants has been trebled or quadrupled.

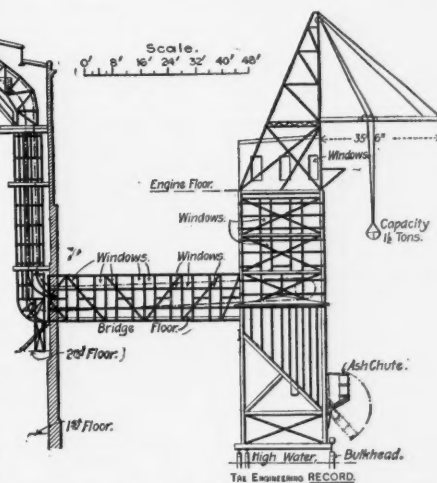
The Ofoten Railroad, which is to give an outlet to the Norwegian coast for the iron ore of Northern Sweden, is in the Arctic zone, but in spite of a temperature of 58° below zero, work was prosecuted on it all winter. In a distance of 172 miles, this road will have only two stations. Nearly the whole traffic will be ore westward and supplies for the miners eastward.

According to the recent annual report, the receipts from the traffic through the St. Gotthard Tunnel in the year 1898 were 18,500,000 francs, as compared with 17,800,000 in 1897, 17,000,000 in 1896, and 16,400,000 in 1895. The number of passengers was 2,360,607, of which 97,774 were first class and 1,768,925 third class. The expenses of operation were 1,500,000 francs.

There is a socialist newspaper addressed especially to railroad men published in Germany, which tells them how they are abused by their superior officers, who, in Germany, are nearly all Government officers. The editor of this journal was prosecuted for slandering one of the Prussian railroad "directories," and was found guilty and sentenced to three months' imprisonment by the Prussian Court, and on appeal this sentence was confirmed by the Imperial Court. What was said of the directory we do not learn; but some accounts of the journal in question indicate that it is at times economical of the truth.

The 2,283 miles of the Swedish State Railroads in 1898 earned at the rate of \$4,437 gross and \$1,702 net per mile of road. The total gross earnings were 4% per cent. and the working expenses 12% per cent. greater than in 1897. The net earnings were 4% per cent. on the capital invested in the roads. The train service was equivalent to a movement of 5.4 trains each way daily over the entire mileage. The number of employees was 14,324, or at the rate of 6¼ per mile—an extraordinarily small number for European railroads. For every employee there were \$708 of gross earnings and 630 train miles. The average earnings per train mile were \$1.12.

A newspaper reports that recently when a train running from Seville to Cordova in Spain halted at the little station of Carlota, it found no one there—no station-master, switchman, or other employee. In Spain a train may not leave a station until ordered by the station agent; and this train waited more than two hours for that person to turn up. Finally, a passenger who was able to telegraph came to the rescue and telegraphed to Cordova to know if the train might go on. Permission having been received, the train started, and just as it got into motion the switchman of the station appeared, very drunk. From him it was learned that the



station-master and his whole staff had gone to a baptism in the next village, where all but the switchman soon got too drunk to stand, not to say walk back. The story continues that the whole force was discharged and prosecuted for neglect of duty. As the Spaniards are perhaps the soberest people in Europe, it seems strange that this particular form of negligence should occur among them.

Our Magyar readers may be lost to us, for hereafter they will have a railroad journal in their own language. The Hungarian Railroad and Navigation Club of Budapest last October began the publication of such a journal entitled "Vasuties Hajozas Hetilap," edited by a committee at the head of which is the Manager of the Hungarian State Railroads.



ESTABLISHED IN APRIL, 1856.
PUBLISHED EVERY FRIDAY,
At 32 Park Place, New York.

EDITORIAL ANNOUNCEMENTS.

Contributions.—Subscribers and others will materially assist us in making our news accurate and complete if they will send us early information of events which take place under their observation, such as changes in railroad officers, organizations and changes of companies in their management, particulars as to the business of the letting, progress and completion of contracts for new works or important improvements of old ones, experiments in the construction of roads and machinery and railroads, and suggestions as to improvements. Discussions of subjects pertaining to ALL DEPARTMENTS of railroad business by men practically acquainted with them are especially desired. Officers will oblige us by forwarding early copies of notices of meetings, elections, appointments, and especially annual reports, some notice of all of which will be published.

Advertisements.—We wish it distinctly understood that we will entertain no proposition to publish anything in this journal for pay, EXCEPT IN THE ADVERTISING COLUMNS. We give in our editorial columns OUR OWN opinions, and those only, and in our news columns present only such matter as we consider interesting and important to our readers. Those who wish to recommend their inventions, machinery, supplies, financial schemes, etc., to our readers can do so fully in our advertising columns, but it is useless to ask us to recommend them editorially either for money or in consideration of advertising patronage.

The main line of the West Jersey & Seashore, the Pennsylvania's line from Philadelphia to Atlantic City, is to be equipped with electro-pneumatic automatic block signals. All practicable efforts will be made to have the work finished before the heavy summer passenger business begins, though the difficulty of getting iron pipe from the overworked mills may possibly cause delay. The line to be equipped is 59 miles long. This is the line over which, in summer, regular trains are scheduled at higher than sixty miles an hour and on which were made the fast runs reported in the Railroad Gazette of Aug. 11 and Oct. 6, 1899, and at other times. At present the road is worked under the manual telegraph block system. We are not told why the change is to be made from the manual to an automatic system so costly as the electro-pneumatic; or why the manual system now used was not converted into the controlled manual with perhaps some additional block stations interpolated. It is not at all difficult, however, to imagine reasons. The frequency of trains at some hours of the day; the great weight of trains often run; the tremendous speeds; the liability to ocean fogs; these, we take it, are the controlling conditions. It is a case where the primary economy of the installation is not of so much importance as several other things. The blocks must be short; the signals must be of the most visible type, and a track circuit is highly desirable, to say the least. In passing it is interesting to learn that the line is to be ballasted with broken stone. As this is the track on which oil was first used to lay the dust, the present announcement, which comes from an officer of the road, would seem to indicate that in the sands of New Jersey a "dustless road bed" cannot be satisfactorily made with oil, if very fast trains are to be run.

The Trunk Lines and Competitive Rates.

There are hopeful signs that the trunk line freight-rate situation, which is now good, will be kept in that condition; will be so kept by the only means which it is possible to adopt, an understanding between a few men, each of whom possesses and exercises authority. The presidents of the two chief competitors, the New York Central and the Pennsylvania, have been in conference; the President of the Chesapeake & Ohio, the most independent rate reducer in the whole field, announces his intention to resign; and the Pennsylvania appears to have secured some voice in the management of the Baltimore & Ohio. These three items may prove to be the beginning of a change which shall be as beneficial as would be the complete consolidation of a half dozen roads. The first two points are only straws. No one knows what was done at the conference, and Mr. Ingalls does not say whether his retirement will come in a month or a year. The third point is not publicly confirmed. In short, the

ground for a hopeful view is not any decided avowal by the chief parties interested, but the fact that every reported move seems reasonable, and of a character which the respective roads would naturally take. The reporters who have tried to discover what has been done and have had to content themselves mostly with guesses, find conservative railroad men and investors agreeing with them, instead of scouting their tales as preposterous, as has been the case usually heretofore.

The Pennsylvania and the New York Central, with nine-tenths of their business practically non-competitive, are in better position than ever before to soften their competitive operations, and each has at its head a leader, noted for coolness as well as possessing experience and judgment. The trunk line rate question has become so simplified—at least, in those features wherein the worst losses are liable to occur—that we may say more confidently than ever before, that close relations between managers constitute the only remedy needed to make competition reasonable; and the possession by the Pennsylvania of enough stock of the Baltimore & Ohio to secure one voice in the Board of Directors will afford this remedy, so far as those two roads are concerned. The Chesapeake & Ohio has been a Vanderbilt road for years. The retirement of Mr. Ingalls may not make much change in actual rates, but the fewer managers the less friction. One may indulge the hope of ultimate benefit from such a change without in any manner criticising Mr. Ingalls' past policy.

But, however numerous or perplexing the doubts about current matters of rate-making or changes in personnel, there is one broad certainty; conservative capitalists, who are all the time increasing their holdings in the stocks of the trunk lines, are conferring together in a more business-like manner than ever before, and they are coming to be railroad men instead of mere capitalists. Those who fear that comity between capitalists who have heretofore been rivals will be inimical to the public welfare, will, no doubt, be inconsolable when they see a growing harmony between the great railroads; but closer students will see in the unification of each large property and the concentration of authority in a few hands the only possible solution of the problems which are inseparable from such vast enterprises as the trunk line railroads.

An Economical Freight Train Speed.

In the last annual report of the Northern Pacific Railway the Second Vice-President said: "The statement is ventured that there is no single reform that can be adopted in connection with railroad operation that will yield so large an increase in net earnings as the adjustment of time of freight trains with reference to the economical performance of motive power. The growing tendency to accelerate the movement of perishable freight is a useless extravagance and emphasizes the necessity for competing lines to agree with respect to the time of through freight trains." At the time of the publication of this report we called attention to these very significant sentences, hoping that some discussion of the topic so important would be brought out. So far little has come to the surface, but interest in the matter seems to be revived. Railroad officers are seriously considering the possibility of reducing freight train speeds, and we believe that the subject is to be introduced at the next meeting of the Western Railway Club by a gentleman quite competent to present it. Naturally, Mr. Kendrick could not go into particulars in his annual report. He does not tell us what are average or maximum freight train speeds on his own road or what he would consider economical freight train speeds. These matters will probably now come out.

We should not be surprised if it is correct to say that no other single reform would yield so large an increase in net earnings. A dozen or 15 years ago the doctrine was pretty ably stated and supported that there would be actual economy in running freight trains faster than they were then run, for the losses in wages, in interest on the equipment, in radiation of heat from the boiler and engines because of the longer time in service, and perhaps other elements, united to make it actually more expensive to move freight trains at low speeds than at high speeds. But even then the highest speed seriously contemplated as economical was 20 miles an hour with 30 as the maximum at very favorable points. It is probable that the notions then plausibly supported have had a certain effect in practice during the intervening period, although unquestionably the one great reason why freight train speeds have been run up to the wasteful height that

they have now reached is the pressure for getting and holding competitive traffic. Engineering considerations have had mighty little to do with the case.

A reform such as is proposed falls into the same class as reduction of passenger train speeds and cutting off duplicate passenger service, a kind of reform often discussed, but in which little has yet been accomplished. A wise control of freight train speeds would not reduce the expenditure of productive energy, but it would save waste, and so it would not only add to the wealth of the railroad companies, which might have the courage to carry out such a reform, but it would add to the wealth of the world. We judge that there can be little question as to the possibility of such a saving, considered from an engineering standpoint. The great difficulty will come from the traffic department. But the engineers can at least try to analyze the subject and to state somewhat definitely the sources of waste and the amount of the economies to be possibly attained.

It is obvious that at slow speeds heavier trains can be hauled. We at once introduce here an economy in wages. If we do the same work with three trains that was formerly done with five trains we save a part of the wages of the crews of two trains. Obviously, all of these wages cannot be saved, because as trains are run slower they must be longer on the road, and although wages are based on the length of run still they must ultimately come down to the basis of time spent.

In spite of the ingenious argument that the longer a locomotive is on the road the greater will be the loss of heat by radiation, nevertheless it will probably be admitted by almost everybody that a great deal of fuel can be saved by running freight trains slower than many of them are now run; inasmuch as a greater amount of heat energy in the coal will be transferred to available energy in the steam at some comparatively low speed.

These, we take it, are the chief elements of economy, namely, wages and fuel; but there are other elements which must be important. The reduction of the cost of maintenance of track and equipment could be considerable. This is so obvious that it needs no demonstration. But aside from the saving in normal wear and tear there would be a certain saving—probably not great, but still significant—in the losses through accidents. It is matter of common knowledge that many derailments, such, for example, as those from broken wheels, have been made much more costly by high speed, than would have been the case at low speed. It is not clear that, generally speaking, a saving could be made by the more regular and uninterrupted movement of the traffic over the road if freight trains were run at low average speeds. It is easy to see that with a mixed traffic the operating difficulties might be increased, but, on the other hand, it seems reasonable that on most roads freight trains could jog along at a slow and steady pace and keep their intervals and keep out of the way of the relatively few fast trains just as well as if the average freight train speed was high. Possibly they could do this even better at a normally low schedule.

Obviously, we are making no effort now to investigate this important subject, or to state knowledge or opinion; our purpose in writing is simply to bring the matter forward and open discussion.

Railroads Dividends in 1899.

The opening weeks of the new year, like the closing ones of the old, have witnessed the addition of a number of railroad shares to the dividend list or the declaration of increased dividends rates on shares on which profit distributions are already being made. Thus the declaration of increased rates by the New York Central from 4 per cent. to 5 per cent. a year and on the Chicago & Northwestern common shares from 5 per cent. to 6 per cent. in the last week of December, to mention only two prominent companies, was followed last week by the declaration of an increase in the dividend rate of the Central of New Jersey from 4 to 5 per cent. a year, and the resumption of dividends by the Cleveland, Cincinnati, Chicago & St. Louis common shares, after an intermission of five years. These payments are fairly typical of many made through the year. New or larger dividend declarations if not exactly a common event of the last twelve months, have been of frequent occurrence.

But increased earnings and new dividends really go back to the previous year, and even to 1897. The changes in dividends and the new payments authorized in each of these years make up a long list. There has, however, been a more or less clear distinction in the class of companies mainly contributing to the dividend changes in the last two years. A notable feature of the new dividends of 1898 and of the previous year was the number of recently reorganized



Fig. 3.—Spring and Equalizer Arrangement.

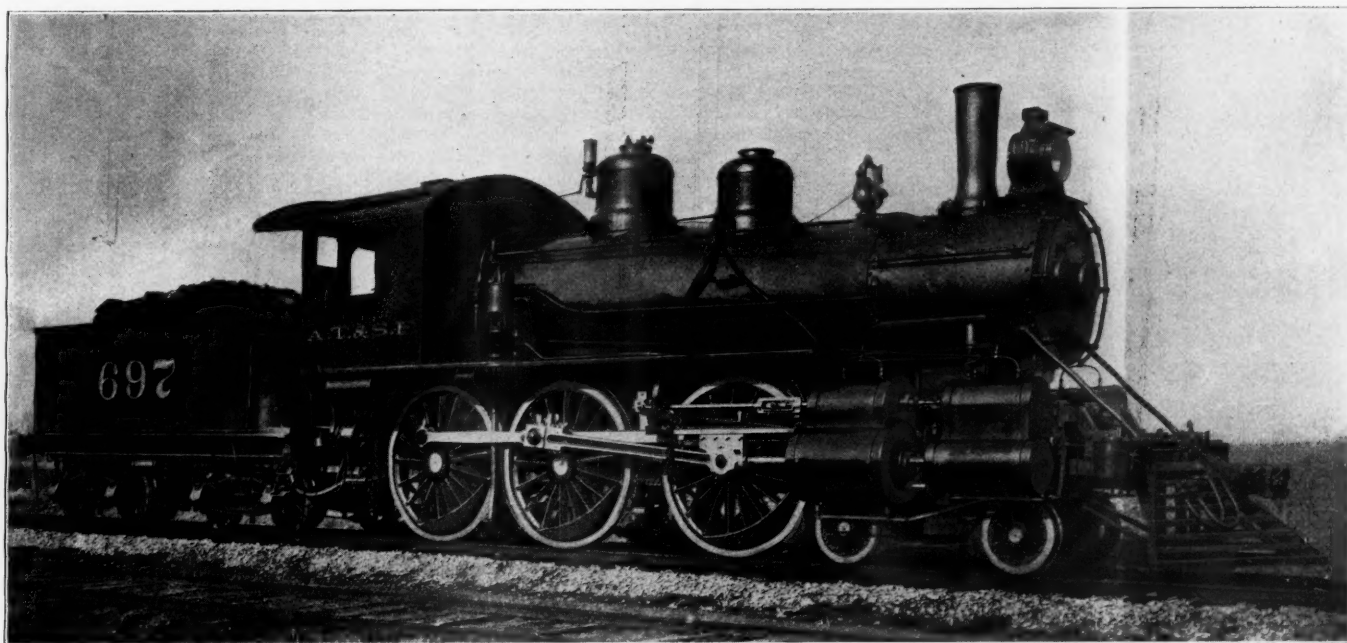


Fig. 1.—Ten-wheel Tandem Compound Passenger Locomotive of the A., T. & S. F. Ry.

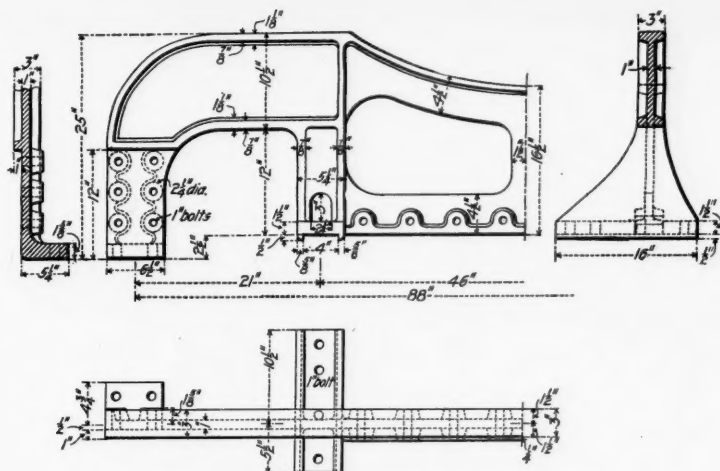


Fig. 8—Cast Steel Guide Yoke for Tandem Compound.

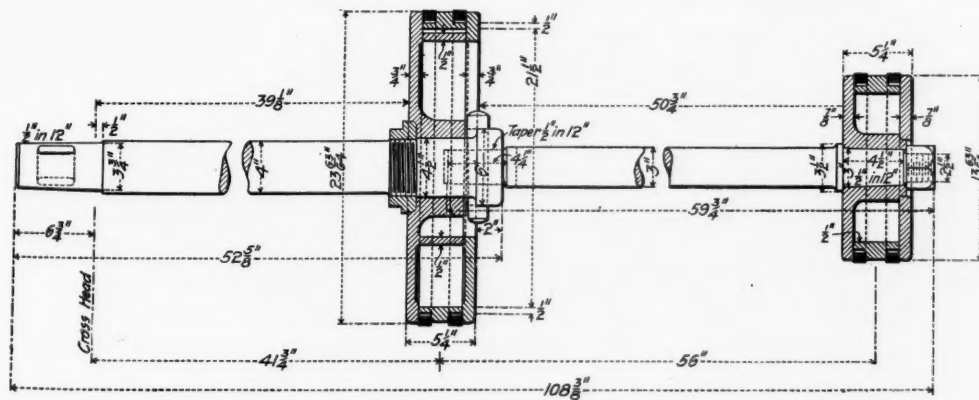


Fig. 9.—Piston Arrangement.

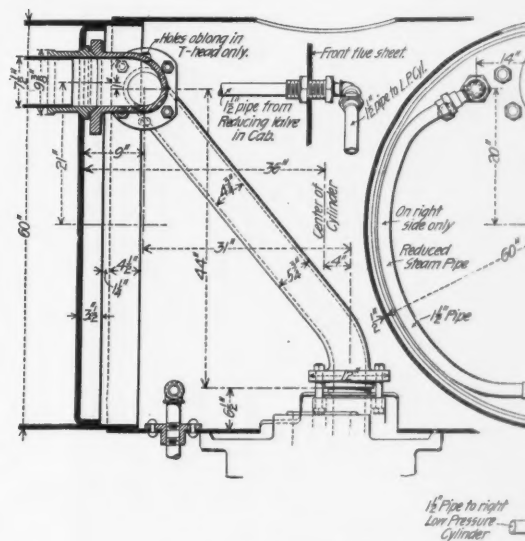


Fig. 12.—Steampipes for Tandem Comp

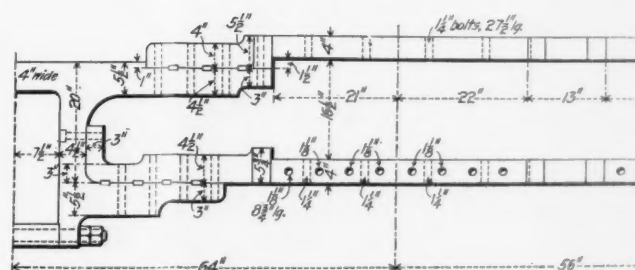


Fig. 4.—Connection of Cast Steel Frame

(Figs. 5, 6 and 7 will be found with the description)

TEN-WHEEL TANDEM COMPOUND PASSENGER LOCOMOTIVE.—Built at the Topeka

MR. JOHN PLAYER, *Superintendent of Machinery.*

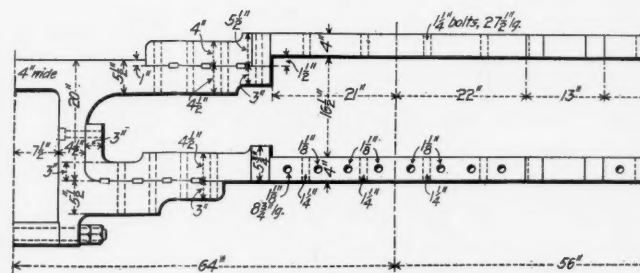
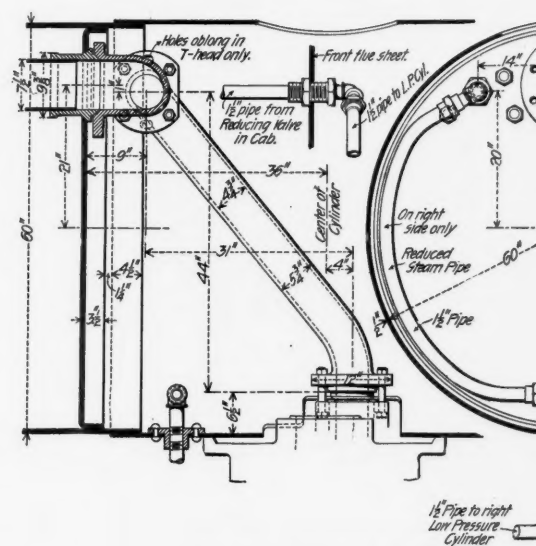
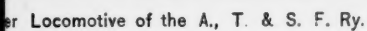


Fig. 4.—Connection of Cast Steel Fra

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dent of Machinery.

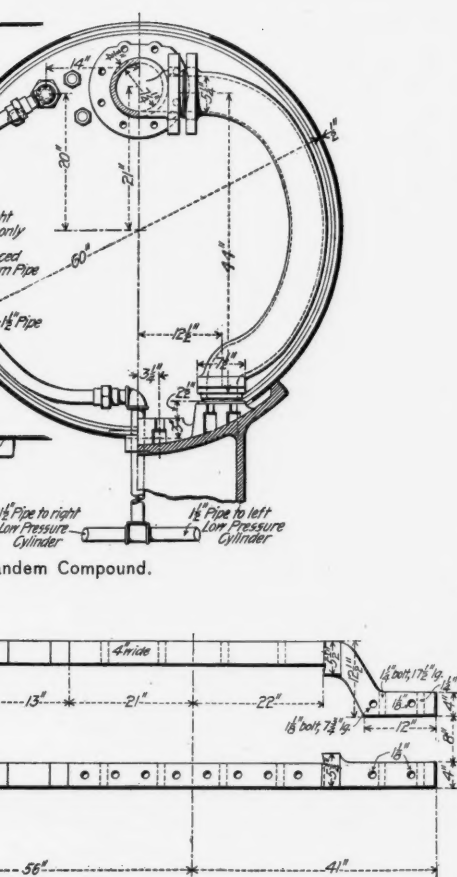
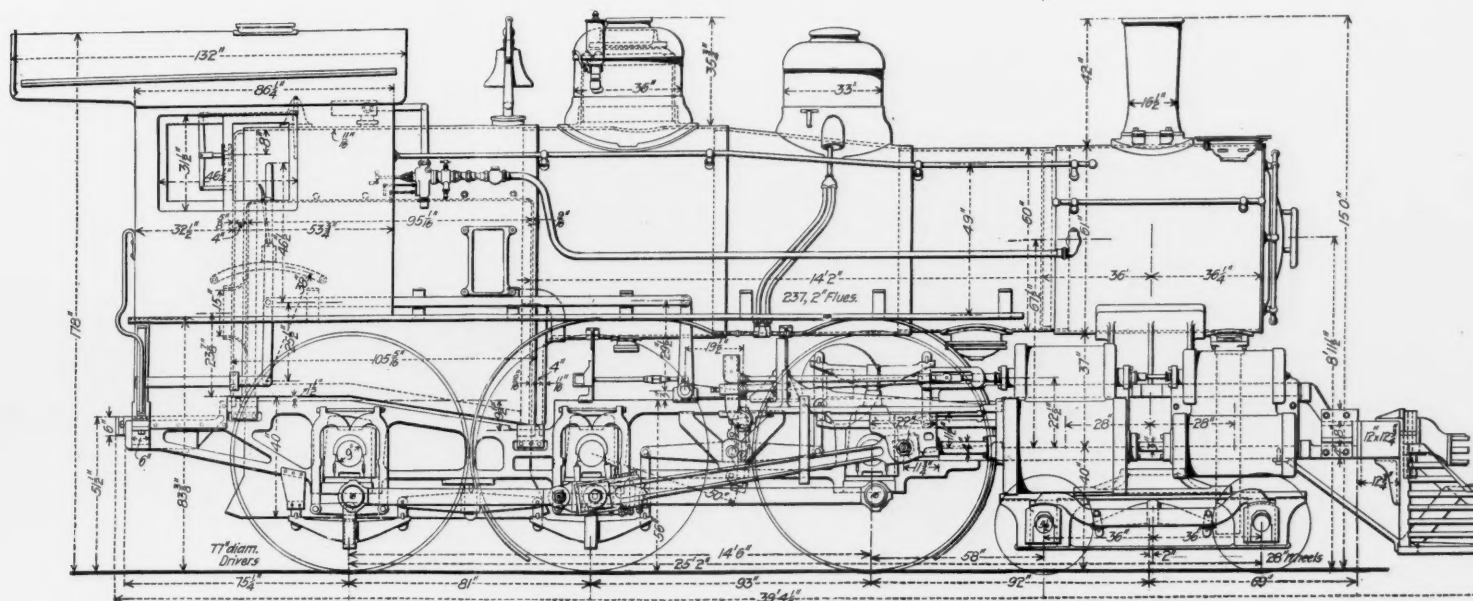
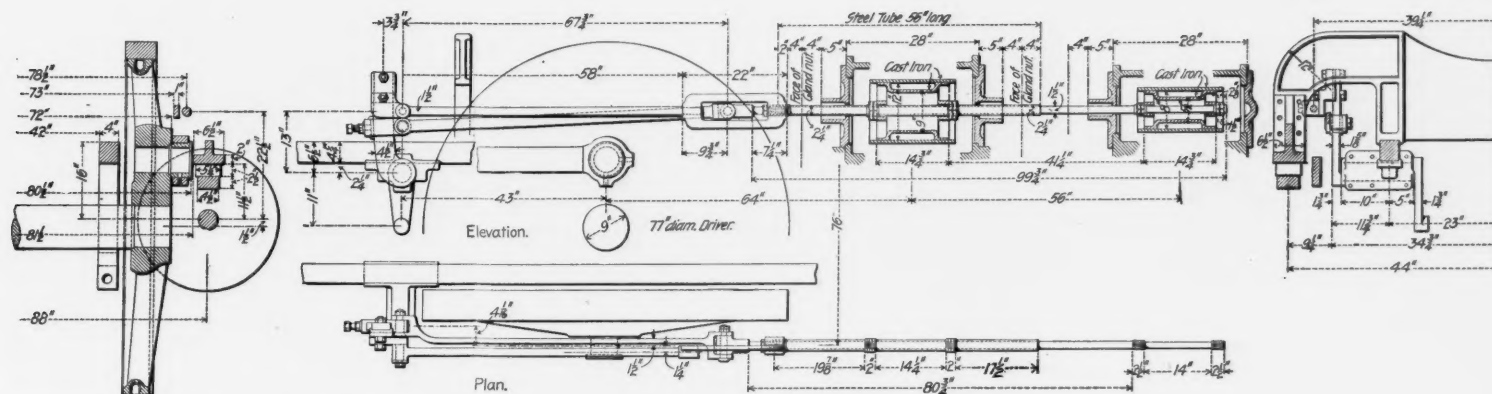


Fig. 11.—Cylinder Saddle.

at the Topeka Shops of the Atchison, Topeka & Santa Fe Railway.

MR. GEO. A. HANCOCK, *Asst. Superintendent of Machinery.*

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companies placing their shares, either one or several classes, on a profit basis. That was direct and tangible evidence of the thorough work of their reorganizers as well as of high earnings. These companies have generally maintained their 1898 dividend record and therefore do not appear to any extent in the 1899 list of dividend changes. That latter is mainly made up of long established companies which have been able to resume dividend payments which they were forced to suspend or to reduce in the disastrous years beginning in 1893. Among the companies thus resuming suspended dividends, besides the Big Four on its common shares, have been the Louisville & Nashville, the Chesapeake & Ohio and the Pittsburgh, Cincinnati, Chicago & St. Louis (Panhandle), the Iowa Central and the Flint & Pere Marquette on their preferred shares. The list of companies increasing their payments is even a longer one.

The dividend history of the year has not been altogether one of favorable action. There have been a few instances of the passing and reduction of dividends and of disappointments through the failure to alter existing dividend rates, by companies which have greatly increased their surplus income. The Lake Erie & Western, which is to pass under the control of the Lake Shore, is one company (the only one that we recall) which has pressed out of the dividend list during 1899. It had paid 5 per cent. annually to its preferred shareholders for many years, but ceased payments rather abruptly early in the last year. A falling off in earnings and the pressing need for funds for equipment and roadway improvement, together with the burden entailed by an unprofitable lease, may be assigned as the immediate causes for stopping dividends. The St. Joseph & Grand Island, a newly reorganized company, which was able to pay 5 per cent. on its first preferred stock in 1898, changed its dividend rates several times in the last year and distributed only 3 per cent. in the year.

Although no change was made in the dividend of the Chicago, Milwaukee & St. Paul, the record would not be complete without a reference to it. Occupying a position of conservative market activity and leadership, its directors' decisions as to the semi-annual dividends are always of importance to the immediate course, at least, of the financial markets. The past year has been one of large prosperity for the company, and increased dividends had been urged upon the directors by important interests. The earnings would provide for nearly double the present dividend requirements, the surplus in the 1899 fiscal year being well over 11 per cent. on the common stock. In the calendar year 1898 the company's gross earnings increased over \$3,910,000, and in 1899 over \$4,468,000. Despite this record, the rate has been maintained unchanged at 5 per cent. on the common shares. The directors have been guided by a policy of assuring the regularity of the present rate by building up a surplus in good times, and in using part of the increased revenue to carry out such improvements as will reduce the cost of working. Much betterment work formerly provided for out of new capital issues is now being paid for out of current income. How well the officers have been able to find use for their increased receipts in betterments on the property is indicated by the fact that, while the gross earnings have increased \$2,165,000 since June 30, net has actually decreased \$170,000. The Delaware & Hudson was also expected to increase its dividend, which had been reduced to 5 per cent. at the beginning of 1897 from the 7 per cent. paid in 1896; but the lower rate will be maintained for the current year under the decision of the directors announced last week.

Turning to the longer list of new and increased dividends, some reference may be particularly made to the Louisville & Nashville and Atchison dividends. Both companies have prospered, and have several times increased their dividend rate in the year. The Atchison's initial dividend, paid in January last, was one per cent. on its preferred shares, the second payment in July last was 1½ per cent., and the last, declared in December, was 1½ per cent. Present net earnings equal about 5 per cent. a year on the \$114,000,000 of preferred stock. The Louisville & Nashville suspended dividends in 1893, when 4 per cent. was paid. Since then the company has thoroughly reorganized its finances and spent a great deal in improvement work, only now regarded as about completed. The first dividend payment in January last was 1½ per cent.; in July the payment was 1½ per cent. and ½ per cent. extra, and this week the stock was put on a regular 4 per cent. basis by the declaration of 2 per cent. for the past half year. In the six months to December 31 last the surplus balance approximated the dividend requirements for the full year.

When the directors of the Pittsburgh, Chicago, Cincinnati & St. Louis declared 1½ per cent. on the preferred stock early last year the dividend had been suspended for three years. Some of the holders of the common shares contend that dividends should be paid on that issue, and have instituted several suits to this end during the year. Their claim is substantially that the articles of consolidation provided that bonds should be issued for extraordinary improvements, and that the balance of net operating

income was to be held available for dividends. They contend that the Pennsylvania directors have acted on a different theory, using current receipts freely to pay for betterments. The suits are reduced somewhat in importance in view of the understood fact that they are instituted by New York speculators, who have no permanent interest in the property, but had succeeded in more than doubling the market price of the shares last year on the hint of being able to force the payment of dividends. The Chesapeake & Ohio has made an initial payment of one per cent. on its 60½ millions of stock, a payment which could easily have been made in earlier years but for the great volume of capital outstanding. The company has been earning a large and comfortable surplus for years.

The Chicago & Northwestern will this year pay 6 per cent. to its common shareholders against 5 per cent. in the four preceding years. In the 1895 fiscal year the dividend distributions got down to 4 per cent. from the 6 per cent. paid for nearly ten years previously. The Northwestern's important controlled line, the Chicago, St. Paul, Minneapolis & Omaha has also increased its dividend to 5 per cent. for 1900, against 3½ per cent. paid in 1899 and 2 per cent. in the two previous years, the first dividend having been paid in January, 1897. Another Western line, the Great Northern, has put up its dividend rate from 6 per cent. to 7 per cent. The enlarged distribution is also on a greatly increased capitalization, this being now \$90,000,000, against \$50,000,000 a year ago. Under recent action of the directors a further addition of \$10,000,000 is to be made to the capital. Quite a number of other important companies have increased their stock issues, and as the new stock has been issued at par to stockholders, when the shares were selling at considerable premiums, the action has enabled stockholders to share in the prosperity of the companies. The New York Central is giving the stockholders the right to subscribe at par for \$15,000,000 of new shares, and the Pennsylvania to about \$13,000,000.

Reverting to the increased dividends, the list given above may be made more complete by noting that the Chicago Great Western, which paid 4 per cent. on its preferred A stock in 1898, for the first time, has recently placed that issue on a regular 5 per cent. basis, and the directors have given more or less definite assurances that the preferred B will receive a dividend in July. The Chicago & Eastern Illinois, which began dividends on its common shares in 1898, placed the issue on a regular 4 per cent. basis in July last. The Denver & Rio Grande, on whose preferred stock 2 per cent. has been paid for several years, is now paying 4 per cent. a year, while the Union Pacific, which paid an initial dividend of 1½ per cent. on its preferred stock in October, 1898, increased the rate to 2 per cent. semi-annually in October last. Its earnings indicate that about 5 per cent. is being earned on the common shares. The Southern Railway, which for three years had paid 1 per cent. on its preferred in January, paid an extra 1 per cent. in July last, or 2 per cent. for the year.

In New England railroad dividends continue unchanged for the most part, however earnings or tonnage may vary, and the only important change that has occurred in 1899 was the action of the Boston & Maine in placing its common shares on a 7 per cent. basis in October, as against 6 per cent. which had been the rate since 1894, when a reduction from 8 per cent. was made. Among companies of less importance entering the dividend list in 1899 for the first time, or after a long suspension, were the reorganized Hocking Valley, which declared 1½ per cent. on its preferred shares; the Evansville & Terre Haute, which paid 2 per cent. on its common stock, the first dividend since 1892; the Pittsburgh, Bessemer & Lake Erie; and the reorganized Chicago, Indianapolis & Louisville, which declared 1 per cent. on its preferred.

This long list of new dividends or increases has followed a period of unexampled prosperity for the railroads, and the action of railroad directors in dividend declarations has been marked by caution. A large portion of the dividend paying companies are earning a net income approximately double the amount they are distributing to their stockholders, without counting the sums, in many cases very large, which are being deducted out of current receipts for betterments. It seems quite possible that there will be less irregularity in railroad dividends in the next few years than usually follows a decline from a high wave of prosperity. Certainly there is no reason to expect any great insolvencies. The surpluses which have been rolled up will reasonably secure the railroads against the experiences following 1893. Many companies which have not yet begun the payment of dividends seem to have well secured the continuity of their interest payments by building up their surpluses and holding in hand large balances which might have justified dividends, just as the dividend payers have assured more or less regularity of dividends by the same policy.

On Thursday, Jan. 4, a special train, consisting of a locomotive and one passenger car, was run over the Southern Railway from Salisbury, N. C., to At-

lanta, Ga., 312 miles, in 6 hours 46 minutes, or at the rate of 46 miles an hour. The time consumed in stops was 32 minutes, making the rate of speed while in motion 50 miles an hour. This is a creditable performance, as the train was run on short notice and the dispatcher did not have time to clear the road for it before it was started; but we mention the run more particularly for the purpose of exposing the sensational and untruthful account of it which was published in the Atlanta Constitution, and telegraphed to papers in many other cities. The headings in the New York paper read "313 miles in 279 minutes," making a rate of about 67 miles an hour. The Constitution, having set out to make a thoroughly yellow paper on that day, and having secured portraits of the actors, with which to adorn its first page, concluded to spare no pains to please its readers, and printed the time in tabular form, as though it were official; though, to justify the heading, it was necessary to falsify both the starting and the arriving time, each to the extent of a whole hour. A semblance of truth was given to the arriving time by using a city clock (one hour slower than the time used by the railroad company). The special train was ordered by Mr. G. H. Penniman, of New York, a passenger on the Southwestern Limited, who got left at Salisbury.

The Use of Beech Cross Ties in Germany.

The practicability of using beechwood cross ties has been one of the questions before the railroad engineers of Germany almost from the beginning of railroad building in that country. They have been tried time and again, but none of the trials so far have definitely settled the question as to the value or want of value of beech timber for this purpose. It is a common observation that the ties rot inside, leaving a deceptive shell of sound wood. On the other hand, if beech were available for cross ties a great and cheap supply could be obtained from the German forests, and now there is renewed interest in the subject. A couple of years ago an officer of the German Railroads, Mr. Schneidt, published a discussion of the subject in the "Organ," basing his argument mainly on the favorable results reached on the Eastern Railroad of France in treating beech ties with creosote, which results were confirmed by experience on the Imperial German Railroads in Alsace-Lorraine. Favorable results have also been obtained on the Imperial Railroads from treatment with chloride of zinc. From October, 1895, to September, 1897, over 8,000 beech ties were taken out of the lines of the Imperial German Railroads, of which about one-half had been treated with oil of tar (creosoted) and half with chloride of zinc. The average age of the former was estimated at about 19½ years; that of the latter about 21 years.

The Prussian Railroad Administration has had experiences not so favorable. For example, in 1885 and 1886 experiments were made on two pieces of road designated respectively as A and B. On these beech ties were laid treated (a) according to the Blythe system. Others (b) were creosoted by the firm of Julius Rütgers, and still others (c) with chloride of zinc by the same firm.

The ties are steamed with the vapor of dead oil of tar and then the oil is injected under pressure, somewhere from 11 to 18 kilograms of oil being injected into each tie. The ties laid in each of the experimental sections varied in number from 1,000 to 3,000. The table below shows the number of ties per thousand renewed because of decay:

Years.	Experimental Section A.			Experimental Section B.		
	a	b	c	a	b	c
1889 and 1890.....	33	...	...	...	...	...
1891 and 1892.....	102	14	18	...	...	40
1893 and 1894.....	1	88	100	...	...	57
1895 and 1896.....	493	271	292	...	...	198
In the first ten years.....	629	373	410	...	...	235
Per cent.....	63	37	41	o	o	29.5

The main fact shown in this table is the great variation of results that can be found from the same experiment carried on under somewhat different conditions. It is believed that the unfavorable results on Section A were from the fact that the roadbed was particularly difficult to drain.

The conclusions of Mr. Schneidt were that chloride of zinc is not effective and that creosote is the only agent to be considered as a material for the preservation of beech, and, further, that of the various processes only that one is to be considered in which the timber is treated with hot oil of tar.

The process lately used by the firm of J. Rütgers in Berlin consists mainly in that oil of tar is heated in the tank to a temperature of 100 degrees Centigrade, or a little more. It is expected to evaporate the water from the wood before injecting the material under pressure, and seasoning of the ties before treating is not considered absolutely necessary. The process differs essentially from that in vogue on the Eastern Railroad of France, where the beech ties are generally seasoned for a considerable time in the open air and are then kiln-dried before being impregnated.

It is obvious that a necessary first condition to successful treatment is a careful exclusion of wood that has begun to decay and Mr. Schneidt thinks that carelessness in this respect has had a great deal

line Works in order to promptly fill the orders for fennoline wood preservative and wood turpentine, which the company states are coming in faster than at present can be taken care of. Sixty-five barrels of wood preservative are being shipped to the American Car & Foundry Company.

Brown Caldwell, recently Secretary of the Peerless Rubber Mfg. Co., has assumed the position of General Eastern Representative of the Sargent Company, and will have offices in Pittsburgh and New York.

The factory of the Dressel Railway Lamp Works at 3876 Park Avenue, New York City, was burned during the night of Jan. 5. Fortunately the company had just shipped a large amount of finished goods and the seriousness of the loss was therefore much reduced. The work of rebuilding is already under way and when finished the plant will be run day and night to fill orders now in hand. The business of the company for 1899 was greater than for any two years in the history of the company.

Iron and Steel.

The Illinois Steel Co. is employing an average of 8,500 men, and last year used 5,429,721 tons of raw material.

Quotations for 3,000 tons of rails and other railroad track material for early shipment to Australia, were received last week in New York. Other mill lots of rails, according to local mill agents, are needed for immediate export to Cuba, Mexico and Brazil.

The Chicago & Northwestern has ordered 30,000 tons of rails from the Carnegie Steel Co., Ltd., for use on the cut-off at Boone, Ia.

The British Chilled Iron & Steel Co., Ltd., has been formed in London, Eng., with a capital of £75,000, to make chilled wheels and castings at Barrow-in-Furnace, on a site bought from the Barrow Hematite Steel Co., Ltd. W. M. F. Schneider is chairman of the new company.

The Seaboard Iron & Steel Co. was incorporated last week in New Jersey to deal in iron and steel and operate carrying vessels. The capital is \$250,000. The Secaucus Iron Co. of Secaucus, N. J., operating one stack and making Bessemer pig iron, has been sold to the new company. Improvements will be made to increase the capacity.

A new company to make malleable iron, in which Chas. James of Philadelphia is interested, proposes to build a plant at Norway Park in York, Pa.

Iron Age says the fact that all the principal sellers of bessemer billets are naming a uniform price, based on \$35 for billets and \$36 for slabs, at mill, in the central west, has given rise to the report that a pool has been formed. According to advices a number of the large producers of bessemer steel have had some conferences at which the necessity was discussed of presenting a united front to the attacks on the steel market which have been recently made. Advices are that while there is no formal organization, harmonious action will be promoted.

John Stevenson, Jr., has been elected Vice-President of the Sharon Steel Co., Sharon, Pa., succeeding Geo. W. Darr of Pittsburgh, resigned. J. S. Fruit and H. P. Forker resigned at a meeting last week as Directors, and were succeeded by V. M. Dalmater and John Stevenson, Jr. The capital stock of the Sharon Steel Co. will be increased to \$4,000,000.

The Republic Iron & Steel Co., in a report to the stockholders, states that from May 1, 1899, to Jan. 1, 1900, the volume of business was as follows: Iron ore mined, 502,184 gross tons; coal mined, 87,634 net tons; coke made, 112,486 net tons; pig iron produced, 265,682 gross tons; muck bar, 279,662 gross tons; ingots, 16,023 gross tons; finished material of all kinds, 525,951 net tons. The chief plants are located as follows: Blast furnaces—two in Pennsylvania, two in Ohio, three in Alabama (one building); Steel plants—one in Alabama, one in Minnesota, one in Ohio (building); rolling mills; two in Pennsylvania, eight in Ohio, one in Kentucky, eleven in Indiana, three in Illinois, one in Minnesota and two in Alabama. All the blast furnaces and rolling mills are active and producing at the rate of 1,000,000 tons of finished iron and steel per year and 425,000 tons of pig iron per year.

New York Rapid Transit.

The bids for building and working the underground rapid transit railroad in New York City will be opened by the Rapid Transit Commissioners Monday, Jan. 15, at 12 o'clock noon.

The Federal Steel Co.

Speaking of the steel situation, President E. H. Gary, of the Federal Steel Co., said that a better year is expected in 1900 than last year. The demand for pig iron is still in excess of the supply, while it is almost impossible to obtain coke at any price. His company would like to get more coke, although it now has a supply of about 125,000 tons per month. The Federal Steel Co.'s ovens have an output of about 80,000 tons per month, which will be doubled by next May. Contracts have been made to sell nearly 3,000,000 tons of ore, or about the entire output of the Minnesota Iron Co., for the next season, beginning in May. Part of this ore will be used by the Illinois Steel Co.

Tie Treating on the Mexican Central.

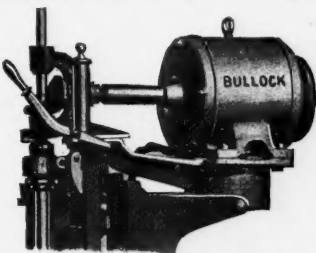
The Mexican Central Railroad will build a tie treating plant at the Chavinda station. It is not expected now that the plant will be built for a year yet, and consequently any publication of the plans would be premature.

The Isthmian Canal Commission.

The members of the Isthmian Canal Commission sailed from New York last Saturday on the Atlas Line steamer Alene, expecting to be gone about three months.

An Application of Electric Drive.

In the accompanying illustration is shown a simple method adopted by the Bullock Electric Manufacturing Co. for driving a machine by an electric motor, where a constantly varying length of shaft is required. The motor is connected with the spindle of the profile as shown, by a splined shaft and sleeve, and the former sliding in and out



within the sleeve allowed for the varying lengths and the speed.

Axle Lighting in Germany.

A distinguished German engineer writes: "The railroad officers and directors in this country try new inventions carefully and thoroughly without making much fuss about it. They have tried Mr. Stone's electric light and have rejected it, of course without giving any explanation to the public why they have done so."

Automatic Signals on the Lackawanna.

The Delaware, Lackawanna & Western has put in Hall automatic block signals between Little Falls and Paterson, on the eastbound track, and between Paterson and High Bridge, on the westbound. There are three blocks on the eastbound track and five on the westbound.

Yellow Signal Lights.

The Canadian Pacific has adopted Baird's yellow glass for the lights in the distant signals at all its interlocking plants, and we understand that the officers of the road report complete satisfaction with the use of the new lights. The Canadian Pacific is also preparing to adopt green for the night go-ahead indication in fixed signals.

Master Car Builders' Association.

We announced last week that the Thirty-fourth Annual Convention of the Master Car Builders' Association will be held at Saratoga, N. Y., commencing Monday, June 18, 1900, which is five days later than prescribed by the By-Laws. This change was made by the Executive Committee in accordance with the instructions of the Association at the last convention that this convention and the convention of the American Railway Master Mechanics' Association may be held during the same week. Headquarters will be at Grand Union Hotel, which has made terms for members and their friends from \$3 per day to \$6. Members of the Association will have preference of rooms until March 15, 1900. Applications for rooms should be made to Woolley & Gerrans, Saratoga Springs, N. Y. The Joint Committee of Arrangements consists of Messrs. R. C. Blackall, A. M. Waitt and Albert Waycott.

A Mistake in Diagnosis.

Mr. O. Chanute was one of the speakers at the recent dinner of the Western Society of Engineers in Chicago, and took the opportunity to make a confession. He said that when the first bridge was built across the Missouri River at Kansas City it was thought that all the piers had been placed on bed rock, but 25 years later, and after three examinations, it was discovered that the pivot pier really rested on large stone slabs apparently thrown down from a higher elevation. Between the bottom of the pier and the solid rock there is a vein of sand, another of clay, and then a vein of soapstone, in all 15 ft. deep. In the meantime the pier had not settled nor given any trouble. But Mr. Chanute concluded that "here is a case in which three sets of engineers had been mistaken in their belief as to the foundation of that bridge. I instance this and I make this confession simply that we all of us may be on our guard against making similar mistakes."

THE SCRAP HEAP.

Notes.

A grain elevator 410 ft. long by 108 ft. wide, recently built at Amsterdam (The Netherlands) is said to be the only one in that country. The building was put up by the city and has been leased for 55 years, at \$2,400 a year, to Messrs. Korthal Altes.

In Chicago, during 1899, 274 persons were killed by what are termed by the city officials "railroad accidents." Of these only 12 were passengers, 64 were employees of the roads, and the others were classed as "otherwise." Fifty-seven deaths occurred at grade crossings, and 53 were killed while walking on tracks.

The night express train of the Chicago, St. Paul, Minneapolis & Omaha, between St. Paul and Omaha,

is to be run over the Fremont, Elkhorn & Missouri Valley between Sioux City and Omaha. That is to say, the train will run between the last-named cities on the west side of the Missouri instead of the east. By this change the distance will be shortened 23 miles. It is said that the time of the train is shortened for the purpose of competing with the new line between Minneapolis and Omaha, which is to be opened by the Illinois Central and the Minneapolis & St. Louis.

Press dispatches from Cleveland state that the Brotherhood of Railroad Trainmen has withdrawn from the Federation of American Railway Employees. It appears that the officers of the Federation are too conservative in their views concerning strikes and it is supposed that the withdrawal is to enable the trainmen to deal more directly and promptly with their employers concerning insufficient wages or other grievances. The conductors, the firemen and the telegraphers are the remaining members of the Federation and it is predicted in some quarters that the organization will now be given up.

The extra session of the Michigan Legislature, which was called by Governor Pingree for the purpose of amending the constitution so that railroad property could be made to share an increased burden of taxation, proved a complete failure. The session lasted 20 days and the Lower House appears to have agreed with the Governor's views, but the proposed constitutional amendment was rejected by the Senate. It looks as though the action of the Legislature was based not so much on the merits of the question before it, but upon the feelings, either personal or those connected with petty politics, which the members entertain toward the Governor. Even the Lower House rejected, by a decided majority, the proposition to allow the city of Detroit to own its street railroads.

English Light Electric Railways.

The total number of light railways now awaiting consideration and sanction of the Light Railways Commissioners is 43. Of these 32 are electrical and 11 steam. The total length is 433 miles. They vary in length from 1/2 mile to 67 1/2 miles. The last-mentioned is a very comprehensive scheme for connecting a large number of South East towns and districts on and near to the coast by trolley lines. It is known as the Cinque Ports scheme. Seventeen of the new lines are designed to be of 4 ft. 8 1/2 in. gage, 14 of 3 ft. 6 in., and 1 of 4 ft.

Manchester Electric Railways.

The Manchester (England) municipal authority is pushing on with its large street trolley line system. Orders have been placed for 5,000 tons of rails, and tenders are now being invited for 450 electric cars.

The Year's Traffic of the Soo Canals.

The officers of the U. S. Government charged with the duty of watching the canals at Sault Ste. Marie have made the usual compilation of commerce passing through those canals for the year 1899. In the table which follows the totals for both the United States and Canadian canals are given, and these are compared with the year 1898.

Designation.	1898.	1899.	Increase or decrease per cent.
Steamers.....	12,461	14,378	15
Sails.....	4,449	4,776	7
Unregistered.....	851	1,101	29
Total.....	17,761	20,255	14
Net tons registered.....	18,622,754	21,938,347	18
freight.....	21,234,864	25,255,810	19
Passengers.....	43,426	49,082	13
Coal, hard (net tons).....	540,843	841,281	56
soft.....	3,235,607	3,099,606	4
Flour, barrels.....	7,778,043	7,114,147	9
Wheat, bushels.....	62,339,996	58,397,335	6
Other grain, bushels.....	26,078,384	30,000,935	15
Iron, net tons.....	250,170	214,585	14
Salt, barrels.....	301,500	316,539	5
Copper, net tons.....	124,226	120,050	3
Iron ore, net tons.....	11,706,930	15,328,210	31
Lumber, M. ft. B. M.....	895,485	1,038,057	16
Silver ore, net tons.....	487	487	.....
Building stone, net tons.....	4,670	39,063	736
Unclassified, net tons.....	623,146	587,484	6

The United States canal was opened May 2 and closed December 18, 1899; season, 231 days.
The Canadian canal was opened April 26 and closed December 20, 1899; season, 239 days.

Fast Run on the C. M. & St. P.

Among the numerous trains with which great speed records are now being made is the fast mail of the Chicago, Milwaukee & St. Paul, leaving Chicago at 9.55 p. m. and due to reach Milwaukee, 85 miles, at 11.40 p. m. This train now carries passengers. As the train has to stop at Western avenue, and also at Grayland; and as it has to slacken speed at one track tank and through the streets of Chicago and Milwaukee, its time is fast when there are no unusual delays; but on two trips of which we have received records, Dec. 9 and Dec. 11, the train started out 32 minutes and 13 minutes late respectively, and a large portion of the lost time was made up. The train sheets for those days (which have only just reached us) show that on the 9th the run from Edgebrook to National avenue, 72.9 miles, was made in 70 minutes, and on the 11th the same distance was made in 71 minutes. The track tank at which the speed was slackened is between these two places. The engine was No. 400, one of the new Baldwin compounds; it is Atlantic type, with cylinders 13 in. and 22 in. x 26 in. The weight on the drivers is 72,000 lbs.; diameter of drivers 78 in., steam pressure 200 lbs.

Milwaukee Street Railroad Franchise.

At Milwaukee, Dec. 18, the City Council sent to third reading an ordinance extending for 10 years, or until 1934, the franchise of the Milwaukee Electric Railway & Lighting Co. The ordinance provides for 25 rides for \$1, good from 5.30 to 8 a. m. and from 5 to 7 p. m. until 1905 when such tickets are to be good all day. The company is given additional fran-

chises on certain streets. There was much opposition to the ordinance on the part of the public, mass meetings were held, and soon after the action of the council above noted a suit was brought and an injunction granted to a taxpayer restraining the city from passing the ordinance, on the ground that it was the result of a scheme to give away valuable rights of the city to the street railroad without compensation. But the ordinance was finally passed and signed by Mayor Rose on Jan. 2. The final vote was 25 in favor and one against the ordinance, and 16 aldermen refused to vote in obedience to the injunction. The company was enjoined from accepting the ordinance, but at once put into effect the 4-ct. fare provision, the demand for the new tickets being very large. The question of dissolving the injunction is still pending in the courts.

The Panama Canal Co. of America.

The Panama Canal Co. of America, with a capital of \$30,000,000, was incorporated in New Jersey Dec. 27. The story is that it will acquire the property and rights of the New Panama Canal Co. Of the capital, \$5,000,000 is 5 per cent. guaranteed first preferred stock; \$15,000,000 second preferred stock bearing 8 per cent. non-cumulative dividends, and \$10,000,000 common stock. It is proposed to increase the capital to \$120,000,000 when necessary. The incorporators are: William J. Chapman, Jr., of No. 310 W. 45th St., New York City; Henry Clark, No. 239 W. 74th St., New York City, and Francis D. Pollak, of Summit, N. J. It is said that J. Edward Simmons, President of the Fourth National Bank; Kuhn, Loeb & Co., Edmund C. Converse, President of the National Tube Co.; Warner Van Norden, President of the Bank of North America, and August Belmont of New York, are interested.

The "Alaska Commercial Record" Again.

Some of our readers who have time to take a humorous view of life may remember the case of the "Alaska Commercial Record" mentioned in our issue of Oct. 20, page 732. The editor of that enterprising paper sent to certain locomotive builders a manuscript which he called a "Careful Comparison of Locomotives," asking the privilege of publishing that manuscript in his columns. He had learned that those particular locomotive builders stood pre-eminent in the world and that if a man bought a few of their engines he had to buy others. While the publication of this information did not put the locomotive builders under obligations, yet the price of the "Record" was only eight cents in lots of 1,000, and a year's subscription was given with an order for a lot of 100. We now receive from a maker of car couplers a similar manuscript, also sent out by the "Alaska Commercial Record." It appears that this coupler manufacturing concern is, like the locomotive builder, at the head of the business. It seems that their couplers are "on account of their excellence and superiority rapidly displacing all other makes." Finally the editor assures us that his journal is not interested with this coupler making firm or its products and that it is published solely in the interest of its subscribers and not of its advertisers. Somehow he seems to protest too much.

We see no way of preventing parasites of this sort from preying upon humanity. That great moral philosopher, George Appo, laid down the fundamental principle that a sucker is born every minute and suckers breed bunco steers in the nature of things. We question, indeed, if it is desirable for society to try to protect the suckers. It is a little like interfering with the working of the laws of evolution.

Roadway Premiums on the C. N. O. & T. P.

General Manager W. J. Murphy, of the Cincinnati, New Orleans & Texas Pacific, has issued a circular announcing the following premiums as the result of the last annual track inspection: Best Road Master's division, R. D. Mullane, a gold medal; best Supervisor's division, M. Phillips, \$75; best section, H. J. Murphy, \$60; second best, T. Creekmore, \$50; third best, W. Toney, \$40; best yard, J. Moloney, \$30. Premiums for line and surface based on dynamograph car observations: Best section, Wm. Reddick, \$25; second best, C. W. Dodd, \$20; third best section, A. T. Smith, \$15. M. Rohan, Supervisor of First District, Cincinnati Division, having made the greatest improvement in any Supervisor's district, amounting to over 14 per cent., is awarded a special premium of \$75. It is expected that through this means foremen may next year be able to show decided improvement in those details in which this inspection shows their sections to be deficient.

An Injunction Against New York Rapid Transit.

Mr. Charles N. Fowler, a Member of Congress from New Jersey, and a business man of New York City, has brought suit against the Rapid Transit Commissioners of the City of New York to enjoin them from using plans infringing a patent in which he is interested. It is claimed that a certain part of the plans of the Rapid Transit Commissioners for the arrangement of platforms and tracks at stations infringe a patent granted to Mr. Benjamin F. Carpenter, of Roselle, N. J., in 1896, a half right in which is owned by Mr. Fowler.

Electric Power Plants in Sweden.

Writing from Gothenburg Nov. 23, Consul R. S. S. Bergs says: "Electrical machinery will be in great demand [in Sweden] as soon as the people have fully learned the value of their numerous waterfalls. A large electric power plant will soon be built at Trollhättan; electric railroads and tramways are being planned for Gothenburg, Lund, Bjerröd, and Jönköping. In this line, as is everything else, the Germans are always watchful; they pay close attention to details, and, if necessary, send experts here to study plans, whereby they greatly increase their chances to introduce machinery. If it is not practical for Americans to do likewise, they could possibly employ active agents to represent them here."

Another Decision on the Fourth Section.

The United States Supreme Court, in an opinion by Justice White, has decided the case of the Louisville & Nashville and others versus Henry W. Behlmer, appealed from the Circuit Court of Appeals for the Fourth Circuit. The case involved the construction of the long and short-haul clause of the interstate commerce law. Behlmer was in 1892 a merchant at Summerville, S. C., and was charged 28 cents per 100 lbs. on hay shipped from Memphis, whereas the rate from Memphis to Charleston, S. C., was only 19 cents. The Court of Appeals, as well as the Interstate Commerce Commission, decided that

this was an unjust discrimination, but the present decision reverses the Circuit Court of Appeals. The Court takes the same ground as in the Alabama Midland case.

LOCOMOTIVE BUILDING.

The Gulf & Ship Island has ordered four engines from the Baldwin Locomotive Works.

The Rogers Locomotive Works are building two engines for the Peruvian Corporation.

The Cooke Locomotive Works is building four locomotives for the Mexican International.

The Baldwin Locomotive Works are building one engine for the Huntington & Broad Top Mountain.

The Virginia & Southwestern has ordered six compound engines from the Baldwin Locomotive Works.

The Bennington & Rutland is said to have ordered two locomotives from the Brooks Locomotive Works.

The Baldwin Locomotive Works have an order for one locomotive for the McCormick Harvester & Machine Co.

The Minneapolis, St. Paul & Sault Ste. Marie has ordered a heavy compound, decapod, sample engine from the Baldwin Locomotive Works.

We are reliably informed that the Pittsburgh & Lake Erie is building at its own shops two passenger engines as well as switching engines.

The total number of engines now being built by the Cooke Locomotive & Machine Co. for the Southern Pacific is 30; 24 of these are for the Pacific System and six for the Atlantic system.

The Kansas City, Pittsburgh & Gulf is considering some new locomotives, as noted Dec. 8, but we are officially informed that no decision has yet been reached as to whether orders will be placed.

We are advised by L. W. Van Horne, of Ashland, Ore., General Manager of the Oregon Midland, a road now building, that one switching, two passenger and three freight engines will be required.

We are officially informed that the Philadelphia & Reading has reserved time at the Baldwin Locomotive Works for 30 locomotives, of which 10 will be 10-wheel engines, 10 consolidations, and 10 fast passenger locomotives. The details of these engines have not been fully decided upon as yet.

CAR BUILDING.

The Georgia Northern has ordered 50 flat cars.

It is again reported that the Erie will order a large number of cars.

The rumor that the Mobile & Ohio will let 300 box cars has been revived.

The Delaware, Lackawanna & Western is building 100 freight cars at its own shops.

The Houston & Texas Central has ordered 250 box cars from Barney & Smith Car Co.

The Barney & Smith Car Co. has an order for 100 box cars for the Mexican International.

The St. Louis & San Francisco has ordered 100 box cars from the American Car & Foundry Co.

The Intercolonial is said to have ordered 200 cars from the Crossen Co. and 25 from the Rathbun Co., in addition to the 275 box cars noted Dec. 22.

The Dominion Iron & Steel Co., Sidney, N. S., has ordered 40 flat cars of 60,000 lbs. capacity from Rhodes, Curry & Co.

It is rumored that the Chicago, Lake Shore & Eastern is considering buying about 300 more steel cars, but we have nothing official.

The Central New England has ordered two passenger cars from the American Car & Foundry Co., to be built at its Jeffersonville, Ind., shops.

The Gulf & Ship Island has placed an order with the American Car & Foundry Co. for two baggage and postal cars and one baggage and passenger car.

The Chicago, Milwaukee & St. Paul is preparing specifications for hopper coal cars and will build 5,000 cars of all kinds at its West Milwaukee shops during 1900.

We are officially informed that the Duluth, Missabe & Northern has ordered 300 more ore cars from the Pullman Co. to be duplicates of the 500 noted in our issue of Nov. 17.

The Chicago & Eastern Illinois is getting bids on 250 60,000-lb. capacity box cars independent of the bids asked in conjunction with the Cotton Belt, noted some weeks ago.

It is reported that the International Correspondence School will get bids on three air brake instruction cars to be 70 ft. long and fitted with the best modern equipment.

The 200 60,000-lb. capacity box cars for the Louisville, Evansville & St. Louis Consolidated, noted in our issue of Dec. 8, have been ordered from the Barney & Smith Car Co.

The Pressed Steel Car Company has received an order from the Paris, Lyons & Mediterranean for some steel gondola cars. The number is reported to be 500, which is probably correct.

We understand that the Allegheny Valley is considering steel cars for the 300 coal cars noted in our issue of Jan. 5, and that it has ordered the 100 box cars from the Pullman Co.

We are officially informed that, while the Kansas City, Pittsburgh & Gulf is considering some new coal cars, as noted Dec. 29, it has not yet been decided whether any will be ordered.

The Chicago, Burlington & Quincy will build at its Aurora shops five fine combination baggage and smoking cars to be 70 ft. long, but the details of the plans have not yet been settled.

L. W. Van Horne, General Manager of the Oregon Midland, at Ashland, Ore., advises us that the road, which is now building, will require 100 flat cars, 50 box cars, 50 stock cars, one combination baggage,

mail and smoking car, two coaches and two cabooses.

We are reliably informed that the Missouri, Kansas & Texas has placed an order with the American Car & Foundry Company for 1,240 box cars of 60,000 lbs. capacity, 100 furniture cars 45 ft. long, 200 furniture cars 50 ft. long and 100 coal cars of 80,000 lbs. capacity.

The 12 passenger cars ordered by the Western New York & Pennsylvania from the Jackson & Sharp Co. on Dec. 1 are for June 1 delivery. They will have a seating capacity of 64 persons, will be 54 ft. long, 9 ft. 6 in. wide and 14 ft. 3 in. high. They will be equipped with Sterlingworth brake beams, cast iron brake shoes, Westinghouse air brakes, copper and tin brasses, Janney couplers, Hartshorn curtain fixtures, Pantasote curtain materials, Thornburgh draft rigging, whitewood dustguards, Consolidated heating system, cast iron journal boxes, pressed steel journal box lids, Standard steel platforms, tin roofs, Pickering springs, chilled iron wheels. One of the cars will be a combination passenger and baggage car. Five of the passenger cars will be vestibuled. The road is also having one car built by the Wagner Co.

The South Side Elevated of Chicago is preparing specifications for 20 or more cars on which bids will soon be asked.

BRIDGE BUILDING.

ALBUQUERQUE, N. M.—We are told that the Pueblo Bridge Co. has the contract for the 640-ft. combination bridge over the Rio Grande River at \$13,000.

BRIDGEPORT, PA.—Reports state that plans are being prepared by the Philadelphia & Reading to abolish the DeKalb, Green, Mill and Third St. grade crossings in Bridgeport, which are to have steel bridges.

CAMDEN, N. J.—We are told that the bridge proposed by the city over Cooper's Creek will be a span of about 120 ft. Nothing positive has been done as yet. Bids will probably be wanted in the spring. L. C. Farnham, City Engineer.

CLEVELAND, O.—No recommendation has been made to the City Council by the City Engineer of the Department of Public Works, we are told, for a new bridge to replace the Middle Seneca St. bridge. At present the Department has only been authorized to rebuild this bridge and has arranged for the financial part of it.

The Pennsylvania RR. has consented to join the city in abolishing grade crossings. In fact all the railroads that have been approached on the subject have assured the Department of Public Works of co-operation. Negotiations are pending with the street railroads in regard to such crossings as they use—about 30 in number. A decision is expected on the whole matter within a short time.

ELIZABETH, N. J.—The Westfield & Elizabeth St. Ry., Edwin W. Hine, Secretary, Newark, N. J., proposes to build an overhead crossing over the Baltimore & Ohio tracks at Aldene near Roselle.

ERIE, PA.—The Erie Transit Co. will probably require a bridge over the tracks of the Nickle Plate railroad.

GRAND DETOUR, ILL.—An iron bridge about 570 ft. long and estimated to cost \$40,000, will be built over the Rock River by Lee and Ogle counties. Bids will be received by a committee from the Boards of Supervisors of both counties, but no date has been set. Wm. B. Farnham, County Surveyor, Dixon, Ill.

GRAND RAPIDS, MICH.—Governor Pingree will ask the Legislature to amend the Grand Rapids bridge act to allow the city to issue bonds for \$150,000 instead of \$100,000 for the proposed bridge at Bridge St.

HADDONFIELD, N. J.—Vice-Chancellor Reed at Trenton, last week, decided that the West Jersey Traction Co. must build a tunnel to cross the West Jersey & Seashore RR. at Haddonfield.

HARLEM, MONT.—Luke C. Hays, U. S. Indian agent at Fort Belknap, this place, will receive bids until Jan. 17 for a Howe truss bridge over Milk River at the agency.

KANSAS CITY, MO.—The Metropolitan St. Ry. Co. has agreed to build a 400-ft. viaduct over Agnes Ave. where the Northeast Electric road crosses.

KLAMATH FALLS, ORE.—The Oregon Midland RR., we are told, will need two steel bridges of about 160-ft. span. Geo. T. Baldwin of this place is President.

MANISTIQUE, MICH.—The Manistique & Northwestern has under survey two miles of extension on which a bridge will be necessary.

MILWAUKEE, WIS.—An ordinance has been introduced in the Council to build a viaduct to connect the West and South sides at the foot of West 27th St., spanning the Menominee Valley. The City Engineer estimated that it would cost from \$325,000 to \$420,000, exclusive of the land.

MINNEAPOLIS, MINN.—The proposition to replace the bridge across the Mississippi River at Cedar Ave., connecting Tenth Ave., S. E., and Cedar Ave., is again under consideration.

MORELAND, PA.—A new bridge has been recommended over Laurel Run to be built by Lycoming County.

MT. VERNON, N. Y.—The City Council has ordered the Commissioner of Public Works to prepare plans for removing grade crossings over the New York & Harlem at Oak St. and Mt. Vernon Ave., where viaducts are to be built.

An iron bridge of five spans, one a draw span, will be built by the city of Mt. Vernon and the New York Central & Hudson River RR. over the Hutchinson River and the New York and Harlem RR. The estimated cost is \$50,000.

NEW HAVEN, CONN.—The Director of Public Works reports that it will cost about \$30,000 for a new span for the Tomlinson bridge. The Board of Aldermen has the matter under consideration.

NEW WHATCOM, WASH.—Five bridges on the

Nooksack River at Whatcom were recently washed out. The loss is estimated at \$30,000.

NEW YORK, N. Y.—A bill has been introduced in the Legislature which provides for the appointment by the Governor of a Commission to consider building a cantilever bridge over the East River from Manhattan to Queens Borough over Blackwell's Island.

The Mayor has signed the three resolutions for building the two new bridges across the East River which were passed by the Board of Aldermen and the Council Dec. 30. The first authorizes a bridge built from Pike Slip, Manhattan, to Washington, St., Brooklyn. The second authorizes the issue of \$1,000,000 bonds for the work. The third authorizes the issue of \$1,000,000 of bonds for the bridge proposed from East Sixtieth St., over Blackwell's Island to Long Island City. Preliminary work is in progress on both bridges.

OGONTZ, PA.—A bridge, to be built on the York Road at Ogontz, Montgomery County, is estimated to cost \$15,000.

OSWEGO, KAN.—Bids will be received until Feb. 6 by the County Clerk of Labette County for iron bridges to be built over various creeks.

OXFORD, PA.—The Chester County Commissioners have decided to build the inter-county bridge over Octoraro Creek, five miles from Oxford, in Little Britain Township. H. N. Herr of Lancaster can give information.

READING, PA.—An ordinance was recently introduced in the City Councils requesting the Philadelphia & Reading to build a new bridge across the tracks at Schuylkill Ave.

REGINA, N. W. T.—J. T. Dennis, Deputy Commissioner of Provincial Public Works, will receive tenders for a steel bridge over the Bow River near Cochrane.

ROCKFORD, ILL.—Bids will be received within a month by the Town Road Commissioners for an iron bridge 600 ft. long to cross Rock River, and estimated to cost \$25,000. (Sept. 15, 1899, p. 648.)

RUSHVILLE, ILL.—Three bridges will be built in Birmingham Township and two in Woodstock Township, Schuyler County, according to report.

ST. PAUL, MINN.—Reports state that the Chicago, Milwaukee & St. Paul will build a steel bridge over the Mississippi River on the St. Paul-Minneapolis line.

SAVANNAH, GA.—Reports state that bridges are proposed over the Seneca and Clyde Rivers which are about 300 ft. wide. Addison P. Smith, County Supervisor.

SCOTTSVILLE, VA.—A bill has been introduced in the Virginia House to empower the counties of Albemarle, Buckingham and Fluvanna to build a bridge across the James River at or near Scottsville.

SPOKANE, WASH.—Reports state that the Great Northern has let a contract to Geo. S. Deeks & Co. of St. Paul, Minn., for two of the steel bridges on the new right of way in Spokane. The contract price is said to be about \$150,000.

WINGHAM, ONT.—Tenders will be received by John Ansley, County Commissioner, at the Wingham Post-Office, Jan. 20, for a steel bridge on the boundary line between the townships of Morris and East Wawanosh, about one-half mile from this place, to be one span 100 ft. clear between the abutments, 16 ft. roadway, to have seven panels in each truss. The bridge will be supported on concrete abutments about 12 ft. from bed of stream to floor. All to be finished on or before Aug. 15.

WINNIPEG, MAN.—H. N. Ruttan, City Engineer, informs us that nothing definite has been decided about the bridge over Red River at St. Johns Ave.

Other Structures.

ALTOONA, PA.—The Juniata blacksmith shop of the Pennsylvania RR. was destroyed by fire Jan. 5. The loss is said to be about \$100,000. The structure was about 250 ft. long and 70 ft. wide, and about 300 men were employed.

APPLETON, WIS.—The Chicago & Northwestern will build a \$12,000 station at Appleton Junction in the spring.

AUGUSTA, GA.—The Southern Ry., the Central of Georgia Ry., the Charleston & Western Carolina, and the Georgia RR. are preparing plans for a new union depot at this place.

BELOIT, WIS.—The Chicago & Northwestern has decided upon a site for the new passenger and freight stations which are proposed.

BROOKLYN, N. Y.—Work is begun on the site of the large freight station which the Delaware, Lackawanna & Western is to build at Cross St. and Kent Ave., Williamsburg. The property has a water frontage on the East River of 500 ft. The freight depot will be fire-proof and 440 ft. long. It is proposed to lay 20 tracks to the station.

CHICAGO, ILL.—Plans for the new buildings and rebuilding of old ones for the Illinois Car & Equipment Co. at Hegewisch are being prepared by Raeder & Coffin. The principal building will be of brick and steel and the buildings will be equipped to turn out ten steel cars a day. The entire cost of the improvements is estimated at \$250,000. (Dec. 22, 1899, p. 883.)

COLUMBUS, O.—The Norfolk & Western proposes to build a freight house and office building on Mt. Vernon Ave. and Fifth St. It will be 102 x 479 ft. The contract is said to have been let to Messrs. John P. Pettyjohn & Co. of Lynchburg, Va.

DULUTH, MINN.—The Pioneer Steel Elevator Co. has been organized to build a 500,000-bushel elevator at Duluth. Walter Douglas, G. F. Piper, W. S. Archer and C. E. Thayer are interested. Later it is proposed to build a warehouse.

For the proposed new dock of the Duluth, Missabe & Northern, see Railroad Construction column.

HAMMOND, IND.—The car barn of the South Chicago City Ry. Co. at Holman and Sheffield Aves., Hammond, was destroyed by fire on the morning of Jan. 9, causing a loss of about \$130,000. The structure was 75 x 225 ft., and 32 cars, including a number of motor cars and sweepers, were destroyed.

LOS ANGELES, CAL.—The Los Angeles & Pacific has a permit from the Building Department for a new depot to be built on the south side of Fourth St., between Broadway and Hill St. The plans were made by Chas. L. Strange and Fred. R. Dorn. The building is to cost \$40,000. It will have 78 ft. frontage and will be 113 ft. deep.

PITTSBURGH, PA.—Wm. B. Scaife & Sons of Pittsburgh have the contract for the plate girder and steel framework for the extensions to the plant of the Carbon Steel Co.

Messrs. Jones & Loughlin are preparing to build a new blooming mill on the South Side.

Proposals will be received Jan. 23 by the Westinghouse Electric & Mfg. Co. for additions to the machine shop and warehouse at East Pittsburgh.

ROSSLAND, B. C.—Plans have been made by the Canadian Pacific RR. for a new freight terminal at this place. The buildings will occupy the block bounded by St. Paul and Washington Sts. and Second and Third Aves. The freight shed will be 180 x 32 ft. A warehouse will be built.

MEETINGS AND ANNOUNCEMENTS.

(For dates of conventions and regular meetings of railroad associations and engineering societies see advertising page xii.)

The Engineers' Club of Philadelphia.

The annual meeting of the Club will be held Saturday, January 20, at 8 p. m. L. F. Rondinella, Secretary, 1122 Girard St., Philadelphia.

Central and Western Association of Car Service Managers.

The next meeting of the Central & Western Association of Car Service Officers will be held at St. Louis, Mo., Jan. 18th, 1900. Thos. R. Limer, Secretary, Columbus, O.

Northwest Railway Club.

At a meeting of the Northwest Railway Club, January 9, at the Ryan Hotel, St. Paul, Mr. H. F. J. Porter of the Bethlehem Steel Company, read a paper on "Standardizing the Specifications for Locomotive Forgings." A paper on the uses of the slide rule presented by Prof. Gill at the last meeting was discussed.

Western Railway Club.

The next meeting of the Western Railway Club will be held Tuesday afternoon, January 16, at the Auditorium Hotel, Chicago. Mr. F. A. Delano, Superintendent of Motive Power of the Chicago, Burlington & Quincy, will present a paper entitled "What Does It Cost to Run Trains at High Speed?" being a discussion of the factors entering the problem. Mr. W. H. Edgar, President of the Dearborn Drug & Chemical Works, will open the topical discussion on "Boiler Feed Waters and Incrustation."

St. Louis Railway Club.

At the January 12th meeting Mr. A. J. Vanlandingham, Commissioner St. Louis Traffic Bureau, read a paper, entitled "Shippers' Traffic Bureaus; their Relation to Railroads; their Uses and Abuses."

The subject of "Typical Box Car Dimensions" was presented by Mr. G. W. Rhodes, Asst. Gen. Supt. B. & M. RR. in Nebraska.

Question Box Department.—Further discussion was had upon "Rigid and Swing Beam Trucks," as a subject aroused by Question No. 9, "Cause and Prevention of Worn Wheel Flanges?" See Question Box Department in both November and December Proceedings.

American Society of Civil Engineers.

The following is the programme of the forty-seventh annual meeting, Jan. 17 and 18:

On Wednesday, 10 a. m., the meeting will be called to order, annual reports will be read, officers elected and general business transacted. At 1 p. m. lunch will be served, after which, if necessary, the meeting will be resumed. As soon as possible after lunch there will be a meeting of the Board of Direction. At 3 p. m. William Barclay Parsons, M. Am. Soc. C. E., will deliver a lecture, illustrated by a stereoscopic, describing the survey recently made by him in China.

At 9 p. m. reception at the house of the Society, for members, the ladies of their families and guests. Dancing at 10 o'clock.

Thursday will be devoted to an excursion by steamer, admission to which will be by ticket only. At 10 a. m. the steamer Valley Girl, the use of which is obtained through the courtesy of Mr. John H. Starin, will leave the foot of West Forty-seventh street (North River), and visits will be made to the power stations of the Third Avenue Railroad Company and the Metropolitan Street Railway Company. Short illustrated descriptions of these stations are given elsewhere in this issue. It is hoped to make the complete circuit of Manhattan Island, and if this programme can be carried out many points of interest will be passed.

At 8.30 p. m., at the Society house, a paper entitled "The South Terminal Station, Boston, Mass.," will be presented by the author, George B. Francis, M. Am. Soc. C. E., and illustrated with lantern slides. This paper, which was printed in the Proceedings for December, 1899, will then be opened for discussion. After the meeting adjourns there will be a "smoker."

Central Railway Club.

The next meeting of the Club, which will be the annual meeting at which officers will be elected for the ensuing year, will be held at the Hotel Iroquois, Buffalo, N. Y., on Friday, January 12, 1900, at 10 a. m.

Discussion of the report of the Committee on Lubrication of Freight and Passenger Equipment will be continued and at the invitation of the Club, Mr. H. C. McCarty will give a practical demonstration of the proper manner in which to pack a journal box.

The Committee on the Brooks Memorial Hospital Endowment, consisting of Mr. H. C. McCarty, the President, Mr. E. A. Miller and Mr. S. D. Hutchins will report the result of their work in carrying out the plan proposed in the report submitted by Mr. McCarty at the November meeting.

Upon the recommendation of the Executive Committee the report of the Committee on Round House Practice, which was submitted at the March meeting, will be taken up for further discussion.

A special committee consisting of H. F. Ball, Mr. H. H. Perkins and Mr. J. R. Petrie will present a report on "typical dimensions for standard box cars for the country, including the length inside, width inside, and the height inside in the clear, from the top of floor to underside of the car lines at the plate; the cubical contents per foot in length and the total cubical contents; maximum dimensions across the eaves and the height from the rail to the eaves."

The following committee has been appointed to report nominations for officers: Mr. John S. Lentz, Chairman; Mr. A. C. Robson, Mr. John Mackenzie, Mr. G. N. Dow and Mr. J. H. Moore.

Mr. James Macbeth, as chairman, with Mr. O. P. Letchworth and Mr. J. R. Petrie have been appointed a committee to arrange for a lunch to be served at the Hotel Iroquois immediately following the adjournment of the business session of the Club.

Western Society of Engineers.

About 125 members of the Western Society of Engineers attended the annual meeting and dinner, held Tuesday evening, Jan. 2, at the Grand Pacific Hotel, Chicago. A brief mention of this was made last week, together with the names of the officers elected for the ensuing year.

The year 1899 being the thirtieth year of the Society, a special effort was made to get together the charter members, with the result that five of them were present and eight sent letters which were read during the evening. The meeting brought out several interesting facts as to the early history of this Society.

On June 14, 1869, the Civil Engineers' Club of the Northwest was formed at Chicago, and the membership that year was thirty-seven. Of this number fifteen have died, fifteen others have resigned at different times, leaving seven who have retained their membership for thirty years. In 1880 the name of the organization was changed when it was incorporated as the Western Society of Engineers. During thirty years the membership has increased from 37 to 495 at the end of 1899. The Treasurer reported a balance of \$2,444.71 in the treasury. The Society is in possession of a valuable collection of technical books and pamphlets, which, during the past year, were classified and indexed. The Committee on the Paris Exposition reported progress, a large number of engineers and manufacturers having arranged to exhibit under the auspices of the Society. The Committee on Publication reported that all uncertainty as to the "Journal" being self-supporting has now been removed, and we happen to know that the credit for this is largely due to the individual efforts of Mr. T. L. Condron, the Chairman. A few changes in the "Journal" were recommended: That ten numbers be published yearly instead of six, as at present, which would render unnecessary the issuing of advance copies of papers; that the minutes, or proceedings, of the meetings be made a more prominent feature, and that a department of technical book notes be added.

Mr. L. P. Morehouse, Custodian of Deeds of the Illinois Central, and the first Secretary of the Society, read extracts from the minutes of early meetings describing how and by whom the Society was founded.

Mr. Octave Chanute, who joined the Society thirty years ago, made what he was pleased to term a confession regarding the building of the first bridge across the Missouri River at Kansas City, which will be found in another column. He further said that in his recent European trip he had learned that great preparations are being made by the French Society and the Institution of Civil Engineers of England to entertain American engineers who may go to the Paris Exposition.

Mr. Isham Randolph, Chief Engineer of the Chicago Sanitary District, described how on that day water had been turned into the Drainage Channel through a sluice-way. When the channel is full, which will require about eight days, a temporary dam at the Campbell Ave. eight-track bridge will be removed, and everything will then be ready for the full flow of water.

Mr. L. E. McGann, Commissioner of Public Works, Chicago, spoke of the big engineering problems now confronting that city. The center-pier bridges must be replaced by types which do not require an obstructing center pier, tunnels must be lowered to enable the large lake vessels to enter the Chicago River, streets must be paved, sewers built, and in the down-town district some system of conduits should be built for water mains, gas pipes and electric wires, so that the paving will not have to be disturbed whenever repairs to the underground work have to be made. He urged the Society to take an active part in the solution of these problems. Other speakers were Mr. W. H. Finley, Bridge Engineer of the Chicago & Northwestern, Mr. S. S. Greeley, Mr. W. R. M. French and Mr. R. W. Hunt.

Mr. Ossian Guthrie told about the way the Illinois & Michigan Canal was deepened in 1864 at great expense. About one week in all was spent on the preliminary, or other, investigation, and then the work was started and carried through. Mr. Guthrie said: "We did not waste much money in preliminary work, but we wasted a good deal afterward."

PERSONAL.

(For other personal mention see Elections and Appointments.)

—Mr. Robert R. Cromwell and Mr. Henry A. Chittate have been appointed Assistant Engineers in the Department of Bridges, New York City.

—Mr. Virgil G. Bogue, M. Am. Soc. C. E., left New York last week for Central America. He will probably return about March 1. He has gone to make some railroad investigations.

—Mr. G. A. Thompson, who has been appointed Superintendent of Transportation of the Erie Division of the Erie, was in 1887 Roadmaster of the Rochester Division of the New York, Lake Erie & Western (Erie).

—Mr. R. P. Hayes, who, up to a short time ago, was General Auditor of the United Express Company, died suddenly Dec. 29. He was a graduate of Brown University and was also connected with the Sons of the American Revolution.

—Mr. J. Johnston died last week at Bethlehem, Pa., aged 72 years. He was a native of Scotland and

came to this country in 1833. Several years later he entered the employ of the Bethlehem Steel Company's works as Master Mechanic, which position he held at the time of his death.

—Mr. Andrew Reasoner, who retired last spring from the Superintendency of the Morris & Essex Division of the Delaware, Lackawanna & Western, is very ill at his home in East Orange, N. J. An extended account of his life appeared in our issue of March 24, 1899, about the time of his resignation.

—Mr. R. B. Burns has just been made Chief Engineer of the Southern California line of the Atchison, in addition to the duties of a similar position on the Santa Fe Pacific, where he has had charge since the Santa Fe came into possession of the old Atlantic & Pacific road. His headquarters will be at Los Angeles, Cal., and his jurisdiction will extend over all the lines between Albuquerque, N. M., and San Francisco.

—The term of Judge Ira B. Mills, Chairman of the Minnesota State Railroad and Warehouse Commission expired with the year 1899, and it is understood that the Governor will soon appoint a successor. Judge Mills has been a member of the Commission for seven years, having served two full terms as a commissioner and in addition an extra year in which he completed the unexpired term of Judge Kingsley.

—Mr. George A. Coe, recently appointed Superintendent of Transportation of the Ohio Division of the Erie, and Superintendent of Transportation of its subordinate line, the Chicago & Erie, was at one time Trainmaster of the Lake Shore & Michigan Southern. In 1890 he became Trainmaster of the Western Division of the Chicago & Erie, one year later Assistant Superintendent, and in 1892 Superintendent of the same division.

—Mr. Chas. W. Galloway, Assistant Superintendent of the First and Second divisions of the Baltimore & Ohio at Cumberland, Md., was shot and seriously wounded by a clerk in the employ of the same company on Jan. 5. Mr. Galloway was appointed to his present position on July 1 last, being promoted from the position of Trainmaster of the First Division. He served for several years as clerk to T. Fitzgerald, Superintendent of the Baltimore Division at Baltimore.

—Mr. C. R. Fitch, the new General Manager of the Erie Division of the Erie, in April, 1888, was appointed Assistant Superintendent of the Long Island; in September following, Superintendent of the Mahoning Division of the New York, Pennsylvania & Ohio, and two months later Assistant Superintendent and then Superintendent of Telegraph of the Long Island. In 1891 Mr. Fitch became Superintendent of the Eastern Division of the New York, Lake Erie & Western (Erie), and the next year General Superintendent of the same road.

—Mr. W. T. Goundie has been appointed General Superintendent of the elevated lines controlled by the Brooklyn Rapid Transit Company. Mr. Goundie has been for a number of years the General Manager of the Kings County Elevated, which is now a part of the Rapid Transit system. At the same time announcement was made of the appointment of Mr. Eugene Chamberlain as Superintendent of Equipment. Mr. Chamberlain has been in charge of the company's repair shops at Second Avenue and Fifty-second Street, Brooklyn, N. Y.

—Mr. A. M. Mozier, the new General Superintendent of the Ohio Division of the Erie and General Superintendent of the Chicago & Erie, was born in Edison, O., in 1843. He entered the railroad service in 1864 as Telegraph Operator of the Cleveland, Columbus & Cincinnati, now the Cleveland, Cincinnati, Chicago & St. Louis. Mr. Mozier has passed through the grades of Trainmaster, Train Dispatcher, Manager Telegraph, finally becoming Superintendent and Superintendent of Transportation of the Chicago & Erie. Mr. Mozier is the inventor and patentee of the Mozier safety signal, Mozier single track block system and the Mozier three-position semaphore.

—Mr. Fred. T. Perris has left his position as Chief Engineer of the Southern California line of the Atchison, Topeka & Santa Fe to become Engineer in charge of the Santa Fe oil wells. He has been Chief Engineer of the line ever since the Atchison entered the southern California field, about 15 years ago. He had charge of all the construction work when the roads were building. His headquarters as Superintendent will be at San Bernardino. The entire motive power of the Santa Fe in southern California is now operated with oil fuel, and it is proposed to extend its use to the locomotives of the San Francisco & San Joaquin Valley and the Santa Fe Pacific.

—Mr. Archibald Buchanan, Jr., who became Master Mechanic of the Delaware & Hudson at Green Island, N. Y., Jan. 1, was born in New York City April 30, 1869. He was graduated from the public schools of the city in 1884 and entered the machine shops of the New York Central on Thirtieth St., New York, as an apprentice in the same year. He was transferred to the draughting room at the Grand Central Station in 1888, and two years later went to the shops at West Albany as draughtsman. In 1892 he was appointed Assistant Foreman of Machine Shops, and a year later was made Foreman. This position he occupied until he resigned to accept that which he now holds.

—On Jan. 1 Mr. George T. Slade became General Manager of the Erie & Wyoming Valley. He was born July 22, 1871. He entered railroad service in 1893 as clerk in the general office of the Great Northern at St. Paul, Minn., and has continued with that road until his recent change. In 1894 he was Roadmaster of the Cascade Division of the Great Northern, and then, in 1896, Chief Clerk in the Superintendent's office of the Eastern Ry. of Minnesota at West Superior. He was promoted in 1896 to the position of Assistant Superintendent, and a year later to that of Superintendent of the Eastern Ry. of Minnesota, which position he held at the time of his recent appointment.

—Mr. John C. Moorhead, heretofore General Superintendent of the Chicago & Erie and the Ohio Division of the Erie, and who has just been appointed General Manager of the Ohio Division of the Erie, also General Manager of the Chicago & Erie, was born at Moorheadville, Pa., in 1844. He began his railroad career in 1862 as Telegraph Operator on the Lake Shore & Michigan Southern. From then until 1880, when he was appointed Assistant Superinten-

dent of the Michigan Central, Mr. Moorhead held the position of Train Dispatcher on the Atlantic & Great Western, the Erie Division of the Lake Shore & Michigan Southern and the Pittsburgh, Cincinnati & St. Louis. In 1891 he became General Superintendent of the Chicago & Erie.

—Mr. George Van Keuren, General Superintendent of the Erie Division of the Erie, was born in 1861 in Jersey City, N. J., and was educated at Hasbrouck Institute, Jersey City, and Bound Brook Seminary. He entered the railroad service as Chainman in the engineer's corps of the New York & Albany. In 1881 he was chainman and rodman on preliminary surveys on the New York, West Shore & Buffalo. In 1884 Mr. Van Keuren was Assistant Engineer of the Eastern Division of the New York, Lake Erie & Western. From then until 1894, when he was appointed Superintendent of Transportation of the same road and its successor the Erie, he was connected with that road as Roadmaster, and Superintendent of the Jefferson Division.

—Mr. T. N. Kucher, the new Master Mechanic of the Toledo, Peoria & Western at Peoria, Ill., was born at Fort Wayne, Ind., Nov. 9, 1870. After receiving a common school education and a course in a business college, he entered the service of the Pennsylvania Co. as messenger in the Master Mechanic's office at Fort Wayne in February, 1885. A year later he was put in the shops as an apprentice, and in 1892 he was made Assistant Foreman of the Erecting Department. Three years later he was put on the road as a fireman, and after seven months of service was appointed to special duty under the Superintendent of Motive Power. On April 1, 1898, he was appointed Assistant Master Mechanic of the Allegheny & Erie shops and held that position until his recent advancement.

—Mr. W. G. Collins, General Manager of the Chicago, Milwaukee & St. Paul, has resigned, to take effect Feb. 1, and it is understood that he will soon afterward go to Europe to remain for several months. Mr. Collins was born in Wisconsin Nov. 21, 1851, and began railroad work in 1868 on the Chicago, Milwaukee & St. Paul. From 1870 to 1873 he was with the Northern Pacific and the Canada Southern, but in 1873 he returned to the Chicago, Milwaukee & St. Paul, on which road he steadily worked his way up until 1877, when he became Chief Train Dispatcher and Superintendent of the River Division of that road. This position he held until 1889, when he was made Assistant General Superintendent, and in 1891 he became General Superintendent. This position he held until April 1, 1898, when he was promoted to be General Manager.

—Mr. C. A. Messer, whose appointment as Assistant Superintendent of the Concord Division of the Boston & Maine was noted last week, was born at Franklin, N. H., Oct. 18, 1871. After leaving the high school at 16 years of age, he began railroad work as telegraph operator at Concord, N. H., in the Train Dispatcher's office of the Northern R.R., now a part of the Boston & Maine. In 1888 he accepted a position with the Western Union Telegraph Co., and afterward for a time was out of railroad service. He was with the Central Vermont as a spare operator in 1889, going a year later to Concord, N. H., where he acted as Train Dispatcher on the Southern Division of the Concord & Montreal until June, 1894. He then became Clerk to the Superintendent of that Division, but when the railroad was absorbed by the Boston & Maine the following year, he was transferred to Boston, acting as Clerk to Assistant Superintendent Robinson of the Southern Division up to the time of his recent appointment.

—Mr. Robert S. Black, for many years Roadmaster of the Manhattan Elevated, New York City, has resigned and has become General Manager of the Dressel Railway Lamp Works. Mr. Black began service on the elevated roads of New York City in May, 1867, when he assisted in building the first trial piece of elevated structure between Battery Place and Cortlandt Street for the old West Side Yonkers Elevated Railroad. In 1874 he was made General Foreman of Construction and Repairs of the New York Elevated Railroad, and three years later became Supervisor of the Third and Ninth Avenue lines of that system. February 2, 1881, he was appointed Roadmaster of all the lines of the Manhattan Elevated. During his administration he personally supervised all the important improvements to the roadway, including the third tracks, and also the extensions, the work being done by the railroad company instead of by contract. He was President of the Roadmasters' Association of American in 1896 and served for seven years as a member of the Executive Committee.

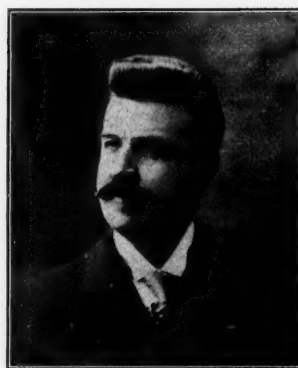
—Mr. J. G. Rogers, who succeeds R. H. Nichols as Superintendent of the New York, Philadelphia & Norfolk line of the Pennsylvania, has spent the whole time of his railroad service, since he entered it in 1882, with the Pennsylvania. He was born in Philadelphia in 1863 and was educated at Lewistown Academy, Lewistown, Pa., besides having three years private instruction in civil engineering. Beginning as rodman in locating and building the Schuylkill Valley, he was made Assistant Engineer of Construction of that road in November, 1885. The following year he became Assistant Engineer of the Philadelphia & Midland, and then of the Piedmont & Cumberland. In January, 1887, he became Assistant Engineer of Construction of the parent road. He entered the Maintenance of Way Department at Altoona in March, 1888, and became Assistant Supervisor of the Tyrone Division in 1889, and of the Pittsburgh Division in 1890. Three years later he was Supervisor of the Frederick Division and a year later Supervisor of the Philadelphia Yard, which position he held at the time of his recent appointment.

—Mr. Edward C. Carter, whose appointment was recently noted in these columns as Chief Engineer of the Chicago & Northwestern, was born Jan. 11, 1854, at Waverly, Ill. His first railroad work was as chainman in 1869. He was graduated from the Rensselaer Polytechnic Institute in 1876, and became a draughtsman in the same year in the machine shops of the Springfield Iron & Steel Co. of Springfield, Ill. The following year he was made Division Engineer on the Chicago & Alton in charge of its extension to Kansas City. The year following he acted as Principal Assistant Engineer in the employ of the Corps of Engineers, U. S. A., on the survey of the lower Mississippi River from the mouth of White River to Greenville, Miss. In 1879, as Division Engineer of the Indianapolis, Decatur & Springfield, he built the extension to Indianapolis, Ind., and later

was in charge of preliminary and location of the proposed extension from Decatur west to connect with the Chicago & Alton at Roodhouse, Ill. For five years, beginning 1880, he was Resident Engineer on the Wabash, in charge of Bridges and Buildings on the lines in Illinois, and as Assistant to the Chief Engineer in the general office at St. Louis. For two years following he was Designing and Contracting Engineer for the Detroit Bridge & Iron Works at Detroit, Mich. Then for 12 years he was Principal Assistant Engineer of the Chicago & Northwestern, from which position on Dec. 30 last he was made Chief Engineer of the same road.

—Mr. S. Dana Greene, General Sales Manager of the General Electric Co., was drowned, with his wife, in the Mohawk River near Schenectady, N. Y., between five and six o'clock on the afternoon of Jan. 8. It was dark and there was a strong wind blowing and they evidently skated into a hole cut by ice harvesters. Mr. Greene was born in Bristol, R. I., in October, 1864. He was a son of Lieut. S. Dana Greene, of the U. S. Navy, who took command of the Monitor in the action with the Merrimac in Hampton Roads after Capt. Worden was disabled. Mr. Greene was the grandson of Gen. George S. Greene, who died recently, and a nephew of George S. Green, Jr., many years Chief Engineer of the Dock Department of New York City, and also nephew of Gen. F. C. Greene. S. Dana Greene was graduated at the head of his class at the Naval Academy in 1883. He soon resigned from the navy and entered the employ of the Sprague Electric Company. He had been in continuous service with the various electric companies which finally became the General Electric, until the time of his death. He was active in the Naval Militia of the State of New York during the war with Spain and served as a Lieutenant in the Yankee. He was a man of great physical strength and vigor and of rare intellectual gifts, and the death of such a man, almost at the beginning of his career, seems particularly deplorable. Mr. Greene's title does not give an adequate notion of the responsibility of his position. He was actually at the head of all the commercial affairs of the General Electric Company at Schenectady.

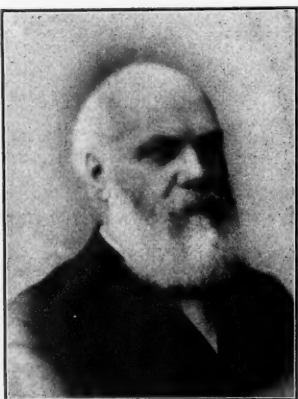
—Mr. Henry U. Mudge twenty-seven years ago, at the age of sixteen was carrying water for a construction gang on the Atchison, Topeka & Santa Fe.



He is now General Manager of that entire system. He was born at Minden, Mich., June 9, 1866. While doing chores for the construction gang he studied telegraphy and in 1874 was an extra operator. In the twelve years beginning with 1876 he served as baggageman, brakeman, conductor, train dispatcher, foreman in charge of construction train, road master and trainmaster. He

was made Assistant Superintendent of the Rio Grande Division in November, 1889, and Superintendent Jan. 1, 1890; Superintendent of the Western Division Feb. 1, 1893, and General Superintendent of the Western Grand Division May 1 of the same year. He was transferred to the Eastern Grand Division June 1, 1894, and made General Superintendent of the entire system Feb. 1, 1896, and General Manager Jan. 1, 1900. With the exception of six months spent as train dispatcher on the Texas & Pacific Railroad in 1881, Mr. Mudge's entire career has been identified with the Atchison.

—After more than 28 years of service as General Passenger and Ticket Agent of the Chicago & Alton, Mr. James Charlton has severed his connection with that company. He is a native of Northumberland, Eng., and entered railroad service in April, 1841, as Junior Clerk in the Freight Department of the New Castle & Carlisle Ry., New Castle-on-Tyne, Eng. When he resigned his connection with that company he had reached the position of Chief Clerk and Cashier in the Freight Department.



He entered the Auditor's office of the Great Western of Canada in April, 1857, as Assistant to the Chief Clerk, and served successively for the next 13 years as Clerk in charge of statistics and freight accounts, Chief Clerk, Auditor and General Passenger Agent. For a little over a year he was General Passenger Agent of the North Missouri R.R., and then on July 13, 1871, became General Passenger Agent of the

Chicago & Alton. Mr. Charlton is not only a railroad man, but an agreeable writer and forcible speaker. Most of his time away from official duties he has spent in reading and writing, and has collected a fine library at his home in Chicago. After a half century of continual service, most men would be ready for retirement. Not so Mr. Charlton. He is ready to employ his rich experience in new fields.

ELECTIONS AND APPOINTMENTS.

Arizona & Southeastern.—R. C. Morgan has been appointed Superintendent, with headquarters at Bisbee, Ariz.

Atchison, Topeka & Santa Fe.—Fred. T. Perris, Chief Engineer of the Southern California line, has been made Engineer in charge of the Santa Fe oil wells of the Atchison, with headquarters at San Bernardino, Cal. R. B. Burns, Chief Engineer of the Santa Fe Pacific, has had his jurisdiction extended over the S. C.

Atlanta & West Point.—F. A. Healy has been appointed Auditor of the A. & W. P. and the Western Ry. of Alabama, with headquarters at Atlanta, Ga., succeeding E. W. Sells, Acting Auditor.

Boston & Maine.—Since Jan. 1, the Portland & Rochester RR. has been operated as part of the Worcester, Nashua & Portland Division of the B. & M. H. W. Davis has been appointed Assistant Superintendent of the Division, with headquarters at Portland, Me. Effective Jan. 1.

Burlington, Cedar Rapids & Northern.—Garret Davis has been appointed Assistant Chief Engineer, and will have charge of Maintenance of Tracks and Roadway, excepting bridges. G. B. Albright has been appointed Assistant General Freight Agent.

Central Vermont.—Wm. Hassman has been appointed Superintendent of Motive Power, with headquarters at St. Albans, Vt., succeeding C. E. Fuller, resigned.

Chicago & Alton.—Owing to the resignation of C. H. Chappell as Vice-President and General Manager, effective Dec. 31, the duties of that position will be assumed by S. M. Felton, President. Clarence Price has been appointed Purchasing Agent, succeeding Mr. Hartwell. The position of General Manager's Assistant has been abolished. Effective Jan. 1.

Chicago & Northwestern.—A. A. Schenck has been appointed Division Engineer of the Iowa Division, with headquarters at Boone, Ia., and will have charge of second track work in connection with his duties as Division Engineer. Effective Jan. 1. The position of Principal Assistant Engineer, formerly held by Mr. Carter, has been abolished. L. H. Evans, heretofore Engineer of Track Elevation, has been appointed Engineer of the Galena Division and the Chicago Terminals. J. S. Robinson has been made Engineer of the Wisconsin Division.

Chicago & Southeastern (of Ind.).—D. H. Conklin, General Manager at Anderson, Ind., has resigned.

Chicago Great Western.—J. M. Robb has been appointed Division Master Mechanic of the Northwest Division, succeeding L. L. Smith, who has been transferred to the shop as General Foreman.

Chicago, Milwaukee & St. Paul.—W. G. Collins, General Manager, has resigned. Effective Feb. 1.

Erie.—The following appointments have been made on the Erie Division of the Erie: C. R. Fitch, General Manager, with headquarters at 21 Cortlandt St., New York; George Van Keuren, General Superintendent, with headquarters at 21 Cortlandt St., New York; and G. A. Thompson, Superintendent of Transportation, with headquarters at Jersey City, N. J. J. C. Moorehead has been appointed General Manager of the Ohio Division of the Erie and General Manager of the Chicago & Erie, a subordinate line of the Erie, with headquarters at Cleveland, O. G. A. Coe has been appointed Superintendent of Transportation of the Ohio Division of the Erie and Superintendent of Transportation of the C. & E., with headquarters at Cleveland, O. A. M. Mozier has been appointed General Superintendent of the Ohio Division of the Erie and General Superintendent of the C. & E., with headquarters at Cleveland O. W. H. Barrett has been appointed Superintendent of the Delaware Division, succeeding Mr. Thompson, promoted, and C. S. Goldsborough has been appointed Superintendent of the Rochester Division of the Erie, succeeding Mr. Barrett. The jurisdiction of C. C. Reynolds, Superintendent of the Lima Division of the C. & E., is extended over the Chicago Division, with headquarters at Chicago, Ill. James Corbett has been appointed Assistant Superintendent of the Chicago and Lima Divisions of the C. & E., with headquarters at Huntington, Ind. Mr. Fitch has also been appointed General Manager of the New York, Susquehanna & Western.

Fitchburg.—W. L. Stevenson has been appointed Superintendent of the Eastern Division, succeeding J. R. Hartwell, assigned to other duties. F. C. Smith has been appointed Division Master Mechanic of the Eastern Division, with headquarters at Boston, Mass. W. Harrington has been appointed Division Master Mechanic of the Western Division, with headquarters at Mechanicville, N. Y. Effective Jan. 1.

Florida East Coast.—G. C. Floyd has been appointed Assistant General Freight Agent, with headquarters at St. Augustine, Fla., succeeding H. S. Kealhofer, resigned.

Great Northern.—On January 1 the position of Superintendent of Motive Power of the G. N., the Montana Central, the Willmar & Sioux Falls and the Duluth, Watertown & Pacific was abolished and hereafter all reports heretofore made to J. O. Pattee, Superintendent of Motive Power, will, until further orders be made to J. C. Morrison, Motive Power Clerk at St. Paul, Minn. George H. Emerson has been appointed General Master Mechanic of the G. N. and the W. & S. F., with headquarters at St. Paul, Minn. Max Toltz has been appointed Mechanical Engineer of the G. N., the M. C. and the W. & S. F., with headquarters at St. Paul, Minn. Effective Jan. 1.

Indiana, Illinois & Iowa.—Riley Williams has been appointed Superintendent, with headquarters at Kankakee, Ill. Effective Jan. 1.

Interoceanic Ry. of Mexico.—C. F. Melick has been appointed Assistant General Freight and Passenger Agent, with headquarters at City of Mexico, Effective Jan. 1.

Louisville, Evansville & St. Louis.—H. C. Barnard has been appointed Superintendent of Terminals, with headquarters at St. Louis, Mo.

Merchants' Dispatch Transportation Co.—F. B. Allen has been appointed Agent, with headquarters at 291 Broadway, New York. The title of General Agent has been abolished. Effective Jan. 1. This change involves several changes and promotions.

Nashville, Chattanooga & St. Louis.—C. H. Barham

has been appointed Assistant General Freight Agent.

Omaha, Kansas City & Eastern.—No changes will result in the officers on account of Charles H. Chappell and James Hopkins being appointed Receivers of this line; the Omaha & St. Louis and the Kansas City & Northern Connecting. (See K. C., P. & G. R.R., News column, Jan. 5, p. 14.)

Plant System.—W. S. Chisholm and W. L. Clay have been appointed General Counsel of the Plant System of Railways, with headquarters at Savannah, Ga.

Pennsylvania Company.—P. F. Smith, Jr., heretofore Master Mechanic of the Northwest System, at Crestline, O., has been transferred to the Southwest System as Master Mechanic of the Logansport Shop. He is succeeded by Joseph D. Harris. L. S. Kinnaird has been appointed Assistant Master Mechanic of the N. W. System, with headquarters at Allegheny, Pa., succeeding Mr. Kucher. Effective Jan. 1.

Pere Marquette.—W. W. Crapo is Chairman of the Board; M. T. Cox, Vice-President; C. Merriam, Secretary and Treasurer; General Manager, S. T. Crapo, and Superintendent of Motive Power, B. Haskell. W. K. Christie, heretofore Master Mechanic of the Chicago & West Michigan at Muskegon, Mich., has been appointed Master Mechanic of the P. M., succeeding T. J. Hatswell, resigned.

Rio Grande Western.—Geo. W. Heintz, heretofore Acting General Passenger Agent, has been appointed General Passenger Agent.

Southern Indiana.—George Crocker having resigned, the position of Chief Engineer is abolished. F. W. Ranno has been appointed Engineer Maintenance of Way. Effective Jan. 1.

Sparks, Moultrie & Gulf.—The general offices of this company have been removed from Sparks, Ga., to Tifton, Ga.

Toledo & Ohio Central.—N. Monsarratt has been elected President and D. Axtell Vice-President of the Kanawha & Michigan.

RAILROAD CONSTRUCTION. New Incorporations, Surveys, Etc.

BELINGTON & NORTHERN.—This company was incorporated in West Virginia Jan. 3, with a capital stock of \$10,000, to build a railroad from Charleston, to run northeast about 125 miles to Morgantown on the Baltimore & Ohio. The incorporators are: N. T. Arnold and J. C. Williams, Ridgway, Pa.; Floyd Teter, F. O. Blue and Chas. F. Teter, Belington, W. Va.

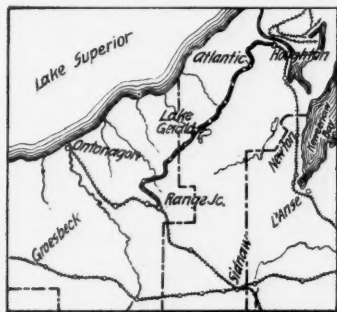
CENTRAL RAILROAD OF INDIANAPOLIS.—This company was incorporated in Indiana Dec. 5, with a capital stock of \$60,000, to build a steam connecting link in Indianapolis between the Indianapolis Union and the Belt RR. Among the incorporators are: Crawford Fairbanks, Terre Haute, Ind.; Daniel P. Edwin and Smiley N. Chambers, Indianapolis.

CHICAGO GREAT WESTERN.—An officer writes that there is nothing in the report that the company will extend its line from Dodge Center, Minn., to Mankato, and from St. Paul, Minn., to St. Cloud. (Jan. 5, p. 14.)

CINCINNATI SOUTHERN.—Extensive improvements are reported under consideration in the mountain region of Tennessee, including cut-offs and a number of tunnels.

COLORADO SPRINGS & CRIPPLE CREEK.—Grading is reported begun on the steam section of this line from Colorado Springs, Col., west 38 miles to Grassy, to connect with the Cripple Creek District Electric Line for Cripple Creek and mining points. E. W. Giddings of Colorado Springs, Col., is an incorporator. (Sept. 22, p. 667.)

COPPER RANGE.—This line, just completed in Northern Michigan, opens up a new field in the copper regions of that state. The line begins at a point near Greenland, on that branch of the Chicago, Milwaukee & St. Paul which reaches Lake Superior at Ontonagon. Greenland is about 25 miles southeast of Ontonagon. The Copper Range road runs northeast 40.9 miles to Houghton on the Duluth, South Shore & Atlantic. Houghton is also a Lake port.



New Line of the Copper Range RR.

With the single exception of Atlantic, near Houghton, there are no settlements at any point along the line. From Range Junction, where the road leaves the Chicago, Milwaukee & St. Paul, stations have been established as follows: Belt, Seager, Winona, Lake Rowland, Lake Gerald, Elm River, Lakewood, Painesdale, Messner and Atlantic. A railroad through this section has been planned for several years but it was not until the fall of 1898 that the work took definite shape. In November of that year Thomas Appleton was made Chief Engineer, with headquarters at Houghton. Immediately after his appointment he began preliminary surveys for the road, and in December the route was determined and locating surveys in progress. On April 3, 1899, a contract for the entire line was let to C. E. Loss & Co. of Chicago, and two months later men were at work clearing the right of way. The road passes through

a heavily timbered country and it was necessary to blast out stumps to clear the way for the graders. The contract specified that the grading should be completed on or before Nov. 1, but delays were caused by unfavorable labor conditions and the date was extended another month. Most of the grading was sub-let by the contractors, who had a large contract on the Illinois Central line which was building at the same time to Omaha. Track laying was begun Sept. 26 at the Houghton end of the line and five miles was completed that month. The rails, weighing 75 lbs. to the yard, was made by the Illinois Steel Co. at South Chicago. There was an average of 900 men and 300 teams at work all summer, and the last spike—appropriately made of copper—was driven Dec. 26.

The contract of C. E. Loss & Co. included all the culverts and bridges with the exception of the steel bridge over the Fire Steel River, which is 1,500 ft. long, composed of three trestles each of 500 ft., and which cost \$60,000. Of the other bridges, the largest, that at Cole's Creek Valley is 320 ft. long and 85 ft. high, and that at the old Atlantic Stamp Mill 400 ft. long and 75 ft. high. It was intended to build these bridges of steel, but the difficulty in getting material made it necessary to build them temporarily of timber. The first passenger train was run on the road Dec. 8, when service was opened from Houghton south 27 miles to the Winona Mine, and with the completion of the road this service has now been extended over the entire line. The road is owned by the Copper Range Co., which controls the entire capital stock and \$1,000,000 of bonds of the road. It also owns outright 8,000 acres of land on the mineral range, and has under option 2,240 acres of land from the St. Mary's Canal Mineral Land Co. The road with its feeders, which are yet to be built, taps a very rich copper mining district. Mr. C. C. Wright, the General Manager, has been the prime mover in the enterprise from the beginning. Ten years ago he proposed a similar road, and has given freely of his time and money. To him is due the support of Paine, Webber & Co. of Boston, who supplied much of the capital to build the road and also interested their friends in the project.

DALLAS & NEW MEXICO.—This company was incorporated in Texas Jan. 4, with a capital stock of \$500,000, to build a railroad from Dallas west through 22 counties to the western line of the State, in all about 500 miles. The principal office is Dallas. Among the incorporators are: H. M. Skelton, Kirk Hall, W. H. McGrath, and Barnett Gibbs.

DULUTH, MISSABE & NORTHERN.—The company is building three miles of second track from Proctor yards, Minn., north, and six miles between Shaw and Wolf. On the Biwabik branch a new line of 3.1 miles is being built to avoid the rebuilding of two long and high trestles. Alexander Sang of Duluth has the contract for this latter extension. Gulberson Bros. have the contract for the three miles north of Proctor, and are also building a double-track spur from the Ereth branch to the Spruce mine, one-half mile long, and a double-track spur to shaft No. 4 of the Adams mine, one-half mile long. (Dec. 29, p. 901.)

At Duluth the company is building 192 pockets for a new ore dock, with a capacity of 210 tons each. The trestle approach leading from the main line to the new dock will be 2,700 ft. long, built for double-track. About 400 lineal feet of this will be of steel and the rest of timber. The dock proper will require 6,500,000 ft. of sawed timber, and 4,780 pieces of piling. The trestle approach to the dock will require upward of 2,000,000 ft. of timber, and 1,474 pieces of piling. The Barnett Record Co. of Minneapolis has the contract for building the dock and timber portion of the approach. It is to be completed by May 1, 1900. (Official.)

GRAND TRUNK.—A spur is proposed from Watertown Station near Hamilton, Ont., westward to relieve the pressure on the Y at that point. Surveys have been completed and building is to be begun soon.

HUNTSVILLE & LAKE OF BAYS.—McMurrich, Coatsworth & Hodgins, Solicitors of Toronto, are applying to the Ontario Legislature for an act to build this line to connect Lake of Bays on the north with Peninsula Lake, and on the south with Halls Lake, with the usual privileges as to docks, wharves, steamers, etc.

JACKSON, SUTTER & AMADOR.—This company is incorporated in California with capital stock of \$2,100,000 to build a railroad from Ione on the Southern Pacific, to run south about 35 miles to Martlets with branches to Jackson, three miles; to Middle Bar, four miles, and north via Sutter Creek and Amada to Dry Town, 12 miles. The Amador Construction Co. has been incorporated in New York to build the road. E. Van Eiten, General Superintendent of the New York Central, is President, and W. R. Woodard, Vice-President of the Randsburg, General Manager. The principal office is San Francisco, Cal.

JAMESTOWN, WILLIAMSBURG & YORK-TOWN.—A bill has been introduced into the Virginia Senate to incorporate this company, with a capital stock of from \$10,000 to \$50,000, to build a railroad from Jamestown on the James River, north about six miles to Williamsburg on the Chesapeake & Ohio, and thence about eight miles more to Yorktown, with a branch through the farm of Kings Mill to Kings Mill wharf on James River. Among the incorporators are: Thomas J. Stubbs, Harry N. Phillips, Norville L. Henley, Thomas H. Geddy, Robert L. Spencer, Hugh S. Bird, Arthur Denmead, L. W. Lane, Jr., J. B. C. Spencer and Edward W. Warburton.

LEHIGH VALLEY.—The New York Railroad Commission has granted the application of the company to build a freight line from Tift Farm to connect with the main line near Depew, N. Y. (Oct. 20, p. 737.)

Mutchler, Connolly & Donnelly of Easton, Pa., are reported to have the contract for laying a third track from Leighton, Pa., to Lizzard Creek Junction, four miles.

MANISTIQUE & NORTHWESTERN.—The company has under survey two miles of terminal track and bridge. (Official.)

MARIETTA, PARKERSBURG & SUMMERSVILLE.—This company was incorporated in West Virginia Jan. 3, with a capital stock of \$25,000, to build a railroad from Williamsburg south about 30

miles to Spencer, both on the Ohio River RR. The incorporators are: Wm. Well and Wm. R. Ryan, Cleveland, O.; Lyssander Dudley, T. L. Shields and Thos. F. Barrett, Parkersburg, W. Va.

MERCER VALLEY.—This company was incorporated in Pennsylvania Jan. 4, with a capital stock of \$30,000, to build a railroad in Mercer County from a point in Hickory Township to a point on the Erie & Pittsburgh line, three miles. F. H. Buhl of Sharon is President. Other directors are Wm. Flynn, Pittsburgh, and John Stevenson, Jr., Sharon.

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE.—An officer writes that there are no improvements as yet being made in North Minneapolis, Minn., but that the company has bought terminals there and will improve them in the spring. (Dec. 29, p. 902.)

MISCELLANEOUS COMPANIES.—The Carolina Construction Co. was incorporated in Virginia Jan. 4, with a capital stock of \$200,000, to do work, it is understood, for the Seaboard Air Line. John Scott of New York is President, and T. M. R. Talcott, Assistant to the President of the S. A. L., is a director.

MISSOURI, KANSAS & TEXAS.—Contracts are reported let and material is on the ground for the Sherman, Shreveport & Southern extension from Jefferson, Tex., southeast 28 miles to Wascom. (Oct. 6, p. 701.)

MORRIS & PORTAGE.—Thomas L. Metcalfe, solicitor of Winnipeg, and H. B. McGivern of Ottawa, agent, are applying to the Dominion Legislature for an act to build a line from Morris, Man., on the C. P. R., to run northwest about 60 miles to Portage la Prairie.

NEBRASKA & GULF.—C. J. Rundel of Lincoln, Neb., has been appointed Special State Railroad Commissioner and Superintendent and General Manager of this proposed line, which is planned to run through Nebraska, Kansas, Oklahoma and Texas. The other Special Commissioners in Nebraska are Warwick Saunders of Omaha, and George Crockett of Knox County. Similar Commissioners have been appointed in the other States. Surveys are completed from Davenport, Neb., to the Platte River near Little Island, about 70 miles, and most of the right of way is secured. (Dec. 15, p. 872.)

NEW YORK, NEW HAVEN & HARTFORD.—The Boston, Mass., Board of Aldermen has approved the route of the proposed extension of the New England R.R. in that city across West Fourth St. and Broadway, both under grade.

NORTHERN PACIFIC.—Surveys are reported in progress for an extension from a point on the main line either at Whitehall or Jefferson Island, Mont., to run north about 30 miles to another extension at Boulder.

PENNSYLVANIA.—An officer writes that nothing is known about any extension of the Altoona Division from Williamsburg, Pa., to Petersburg. (Jan. 5, p. 14.)

An extension is to be built, according to report, from West Brownville, Pa., northwest about 10 miles to Bentleyville.

POCAHONTAS, COAL RIVER & KANAWHA.—Grading was begun last week, according to report, on this line from St. Albans, W. Va., on the Pittsburgh & Ohio, to run south up Coal River about 20 miles into the Pocahontas coal section. Gen. C. C. Watts of Charleston, W. Va., is President. The Equitable Construction Co. of Chicago has the contract.

RIO GRANDE WESTERN.—Surveys are reported in progress for extensive improvements, including a cut-off on the line between Wellington north of Price and Helper. A number of grades are to be reduced. It is stated that grading is to be begun early in the spring.

SOUTHERN.—An extension is to be built, according to report, from Round Hill, Va., west about five miles to Snickersville.

TEMISCOUTA.—Application is made to the Dominion Legislature for an act to build an extension of the St. Francis branch to run west about 100 miles to a point on the Intercolonial at or near St. Charles Junction, Que., or to a point on the Quebec Central at St. Anselme, or to a point on the Grand Trunk at or near Chaudiere Junction.

THE NORTHWESTERN ELEVATED, CHICAGO.—Last week the running of the first train on the Northwestern Elevated, Chicago, was noted, and also the fact that the city authorities ordered all work stopped until the hastily erected portions could be examined; it was claimed that the structure was unsafe. After several attempts to run trains in violation of this order, an agreement was reached which will be presented to the Council as an ordinance. In the meantime permission is given to run one train a day at slow speed. Under the proposed agreement the road is to forfeit to the city \$100,000, deposited a year ago as a guarantee that the work would be completed by December 31 last. May 31, next, is the date set for the completion of the structure between Lake Street and Wilson Avenue and building temporary stations; permanent stations are to be finished by Jan. 1, 1901. The compensation clauses in the old franchise are renewed in the agreement, and other important clauses are that no bridges are to be built to adjoining buildings, that no branch lines are to be built, and that an extension from Wilson Avenue north to the city limits is to be constructed by Jan. 1, 1905, under a penalty of \$25,000 a mile. Property owners are already protesting against stopping the work at Wilson Avenue, which is a quarter of a mile south of the terminus named in the old ordinance. Also, under the new agreement the road would be given the choice of two routes for the extension to the city limits called for within five years. It is claimed that, as the Evanston branch of the Chicago, Milwaukee & St. Paul will probably in time be connected with the Northwestern Elevated, it is now the intention to locate the extension further west, so as to tap the territory served by the Chicago & Northwestern.

UNION PACIFIC.—Surveys are reported in progress for a cut-off from Atkins west to Cheyenne, Wyo., to avoid heavy grades on Archer Hill. The road would enter Cheyenne from the northeast instead of east as at present.

Kilpatrick Bros. & Collins of Beatrice, Neb., have the contract for building the newly located line of

40 miles from Rawlins, Wyo., west through Carbon and Sweetwater counties to Tipton. (Oct. 20, p. 738.)

Surveys are completed for reducing the grades on the main line at the summit between Denver, Col., and Cheyenne, Wyo., just south of Cheyenne.

UNITOWNS, WAYNESBURG & WEST VIRGINIA.—This company was incorporated in West Virginia Jan. 6, with a capital stock of \$1,000,000, to build a railroad from Wheeling to Wheeling Creek on the Pennsylvania State line. The incorporators are: Wm. C. Jutte, Chas. M. Buchanan and A. Jutte, Pittsburgh, Pa.

UNITED STATES & WEST INDIES RAILROAD & STEAMSHIP COMPANY OF PLANT CITY.—This company is to be incorporated in Florida, with a capital stock of \$1,000,000, to build and operate a railroad from Plant City south about 75 miles to Charlotte Harbor on the Gulf of Mexico, and to operate steamships between the United States and points in the West Indies.

GENERAL RAILROAD NEWS.

ATCHISON, TOPEKA & SANTA FE.—Baring Bros. & Co. announce 300 series A equipment bonds drawn for payment, interest ceasing Jan. 1.

BOSTON & ALBANY.—A bill authorizing the lease of this road by the New York Central & Hudson River has been filed with the clerk of the Massachusetts House of Representatives. The State directors of the Fitchburg have made a report to Governor Crane on the lease of the B. & A., in which they state that an agreement exists between the B. & A. and the New York Central by which valuable passenger and merchandise traffic which would naturally follow the Fitchburg route, has been diverted to the B. & A., and has resulted in the depreciation of the value of the State's investment in the Fitchburg route, and they suggest that the interests of the State must be protected with reference to the proposed lease. (Jan. 5, p. 14.)

FITCHBURG.—President Tuttle of the Boston & Maine is reported as making the following statement with reference to the proposed lease by his company of the Fitchburg:

As respects the Fitchburg Railroad, I have waited for an opportune time to consider the question of a lease of that road by the Boston & Maine. I do not think that the Vanderbilts feel that it would be prudent for them to attempt a control of the entire New England railroad field, and therefore I do not think that they were over anxious concerning the control of the Fitchburg road; nor would we wish to control it in antagonism to the Vanderbilt interests. I think the New York Central R.R. interests offered the Fitchburg somewhere around 4 to 4½ per cent. on the preferred stock. I think it was about a 4 per cent. offer; other people think that, with collateral advantages, it was about 4½ per cent. But, however that may be, it is not now pertinent to the case.

When I learned that the Vanderbilt negotiations were ended, I entered into negotiations with Mr. Codman of the Fitchburg, and the result to date is that I have informed Mr. Codman that I believe a lease can be effected mutually advantageous to the Boston & Maine and the Fitchburg, and the New England public, if the Fitchburg people are willing to accept a guarantee of 5 per cent. upon their preferred stock, which, of course, carries a guarantee of 1 per cent. upon the common stock, most of which is owned by the Commonwealth of Massachusetts.

The Fitchburg people now have the matter under consideration. If they favor the proposition, it will have to be submitted in form to both corporations, and then to the legislature, irrespective of the State's vote upon its \$5,000,000 of common stock; for there is a provision in the state laws that the legislature must pass upon any such question as between two railroads entering Boston.

With harmony all around I think everybody interested would be benefited by the Boston & Maine operating the Fitchburg road, with good connections west. To secure good connections west I think that the 2,800 miles of the Boston & Maine system, with the 500 miles of the Fitchburg system added thereto, should be in a position of advantage and importance and should obtain fair rates and connections.

CHESAPEAKE & OHIO.—A bill was introduced in the Virginia Legislature Jan. 6 authorizing the stockholders of this company to reduce the capital stock one-half.

CHICAGO ELEVATED ROADS.—The reports of the Metropolitan and South Side Elevated roads, at Chicago, show a substantial increase in the number of passengers carried. On the first-named road the gain during the last six months over the corresponding period in 1898 was 22.4 per cent.; on the South Side Elevated 19.7 per cent. was the increase in the 12 months of 1899 over 1898. The average number of passengers carried on these two roads is shown by months in the following tables:

METROPOLITAN ELEVATED.			
	1898.	1899.	Increase.
July.....	67,498	53,878	13,620
August.....	68,070	55,925	12,145
September.....	76,184	60,702	15,482
October.....	94,430	74,490	19,940
November.....	88,820	74,745	14,075
December.....	90,682	77,168	13,514
Six months.....	80,930	66,134	14,796
SOUTH SIDE ELEVATED.			
	1898.	1899.	Increase.
January.....	58,762	52,117	6,645
February.....	50,292	52,682	2,390
March.....	63,909	54,827	9,082
April.....	63,878	54,148	9,730
May.....	59,588	49,459	10,128
June.....	56,117	45,427	10,690
July.....	52,644	44,148	8,496
August.....	52,599	41,770	10,829
September.....	59,585	46,576	13,009
October.....	73,793	58,198	15,595
November.....	69,972	59,257	10,715
December.....	72,683	62,735	9,948
Average.....	61,994	51,777	10,217

CHICAGO & GRAND TRUNK.—A bill was filed Jan. 3 in the U. S. Circuit Court at Detroit, Mich., by the Mercantile Trust Co., New York, as trustee, to foreclose the senior mortgage of \$6,000,000 maturing Jan. 1. E. W. Middaugh and John B. Joy of Detroit were appointed receivers. This is under the reorganization plan recently noted. (Nov. 10, 1899, p. 788.)

Simon Borg & Co., New York, give notice to holders of first mortgage bonds that by request of a large number of holders of these bonds resi-

dent in Indiana who deposit their bonds under the agreement of Dec. 21, 1899, they have agreed to represent the interest of the bondholders and prompt deposit of the same is advised.

CHICAGO, PEORIA & ST. LOUIS.—The property of this company and of the St. Louis, Chicago & St. Paul was sold at public auction at Springfield, Ill., Jan. 9 by Special Master Watson to Thos. Carmichael and others of New York representing the reorganization committee, for \$1,000,000 and \$750,000 respectively.

The Chicago, Peoria & St. Louis R.R. Co. was incorporated in Illinois Jan. 3, with a capital stock of \$7,350,000, to take over the property of the two old companies. At a meeting of the directors of the new company held after the sale Chas. E. Kimball of New York was elected President, and Ralph Blaisdell of Springfield, Ill., Secretary and Treasurer. A resolution was adopted authorizing the issue of \$2,000,000 first mortgage on the joint properties. (Dec. 29, 1899, p. 902.)

CINCINNATI, NEW ORLEANS & TEXAS PACIFIC.—S. M. Felton, the former receiver, filed his report at Cincinnati Jan. 9, in the U. S. Circuit Court preparatory to his official discharge from the receivership. The railroad property was taken from his hands on Sept. 30. (Oct. 6, 1899, p. 702.)

DELAWARE & HUDSON.—Announcement is made that the company will issue \$4,000,000 bonds for equipment purposes, of which \$1,500,000 represents car trust receipts, and \$2,500,000 debentures.

DULUTH, MISSABE & NORTHERN.—The Central Trust Co., New York, gives notice that it will receive sealed proposals up to Jan. 15, to sell first consolidated mortgage bonds of Jan. 1, 1893, at a rate not to exceed 105 and accrued interest, the total offer not to consume more than \$79,222. (Feb. 17, 1899, p. 134.)

GREAT NORTHERN.—Stockholders of record on Jan. 29 are offered the privilege of subscribing at par until noon Feb. 24 for 90,000 shares of additional preferred stock at the rate of one share for each 10 shares of present holdings. The proceeds, \$9,000,000, will be used to acquire \$3,500,000 new stock of the Eastern Railway of Minnesota, and \$5,500,000 new stock of the Willmar & Sioux Falls, which are to be issued for extensions and additions to equipment and terminal facilities. The Willmar & Sioux Falls will take over the Sioux City & Northern and the Sioux City & Western.

KANSAS CITY, PITTSBURGH & GULF.—Mr. Max Pam, counsel of the reorganization committee, has announced that the sale of the road will be ordered by the Court to be held some time in February. The arrangements for organizing the new company and issuing new securities under the plan of reorganization are practically completed. (Dec. 29, 1899, p. 902.)

LAKE ERIE & WESTERN.—Semi-official announcement is made that this property has passed under the control of interests allied with the Vanderbilts. The road consists of 725 miles of main line and branches and has a capital stock of \$23,680,000 and a funded debt of \$10,875,000. It is stated that it is to be operated as a part of the Lake Shore & Michigan Southern. A meeting of the directors was held on Wednesday too late to obtain the results for this week's issue of the Railroad Gazette.

OREGON & CALIFORNIA (Southern Pacific).—The title of this company to 420,000 acres of land in Oregon was confirmed by the Supreme Court Jan. 8. The land was patented to the company by the Secretary of the Interior under grant of 1866. Suit was brought by the Attorney General to forfeit the land on the ground that it was covered by a previous grant in 1864 to the Northern Pacific. The Court refused to consider the claim of the Northern Pacific, as no steps had been taken by that company to earn a title to the land.

OREGON RAILROAD & NAVIGATION.—First mortgage 6 per cent. bonds to the par value of \$116,000 have been drawn for payment at par for the sinking fund, at the Farmers' Loan & Trust Co., New York, interest ceasing Jan. 1.

PEORIA, DECATUR & EVANSVILLE.—The foreclosure sale which was set for Jan. 4 at Mattoon, Ill., has been postponed to Feb. 6. (Dec. 22, 1899, p. 888.)

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—Chas. Barrett of Somerville, Mass., on Jan. 2 brought suit in the U. S. Court of Cincinnati, O., asking the Court to enjoin the directors from making certain improvements, on the ground that a contract was entered into in articles of consolidation which require the company to use certain bonds and preferred stock for the improvements, and to pay out the net earnings to the stockholders. This is somewhat similar to the suit entered last February. (Feb. 17, 1899, p. 134.)

RICHMOND, PETERSBURG & CAROLINA.—A bill was introduced into the Virginia Senate last week to change the title of the road and to authorize its consolidation with the Seaboard & Roanoke.

ST. LOUIS, CHICAGO & ST. PAUL.—See Chicago, Peoria & St. Louis.

SAN DIEGO, CUYAMACA & EASTERN.—An officer writes that Mr. Spreckels has not obtained any interests in this property, and that there is no intention of consolidating it with other roads, as reported. (Dec. 22, p. 888.)

SOUTHERN.—Forty-five Richmond & Danville equipment mortgage bonds of Sept. 3, 1899, have been called for payment March 1, at the Central Trust Co., New York, interest to cease from that date.

A bill was introduced in the Virginia Legislature Jan. 6 providing for reduction of the common stock from \$120,000,000 to \$60,000,000.

TOLEDO, ST. LOUIS & KANSAS CITY.—The foreclosure sale of this property has been fixed for Feb. 14. (Jan. 5, p. 14.)

YOUGHIOGHENY.—A committee representing stockholders of the Penn Gas Co., on Dec. 30 filed a bill in equity at Pittsburgh, Pa., against the Pennsylvania R.R. Co., to prevent the consummation of the alleged fraudulent sale of the property of the Youghiogheny to the Pennsylvania, and the Court is asked to appoint a receiver. (Nov. 10, p. 788.)